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**The Archaeology of the Fortifications constructed in England during the English Civil War (1642-1651):  
*Bristol, Gloucester and Worcester***

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**THE ARCHAEOLOGY OF THE FORTIFICATIONS CONSTRUCTED IN  
ENGLAND DURING THE ENGLISH CIVIL WAR (1642-1651):  
BRISTOL, GLOUCESTER AND WORCESTER**

**RICHARD PAUL ISRAEL**

**A dissertation submitted to the University of Bristol in accordance with the requirements  
for award of the degree of Doctor of Philosophy in the Faculty of Arts, School of Arts  
April 2019**

Word Count: 79,710

## **Abstract**

In the middle of the seventeenth century the social, political and economic landscape of Great Britain was dramatically affected by the resulting English Civil War (1642-1651). Whilst the names of battles such as Marston Moor and Naseby are relatively well known, the construction, manning, maintenance and positioning of the fortifications affecting almost every town and city is less understood.

Adopting archaeological landscape techniques this thesis examines three case studies of Bristol, Gloucester and Worcester. Utilising these techniques and examining the positioning of the fortifications and artillery via two new methodologies, GIS Cartographic Analysis and GIS viewshed analysis, the thesis has demonstrated that the artillery positioned in Parliamentary Bristol in 1643 was unable to target all areas and therefore why Washington's Breach occurred. The technique has also confirmed Bernard de Gomme's fears of inadequate defences in Royalist Bristol in 1645. Additional viewshed analysis of Gloucester in 1643 has also demonstrated the weakness of the defences south to Friar's Orchard and explains David Papillon's recommendations after the siege.

Whether Royalist or Parliamentary, this research has demonstrated that control of the towns and cities was vitally important for either side to effectively campaign to win the conflict. The landscape defined the fortification. Design and construction of the fortifications were of secondary importance to having control of the high ground. The case study of Bristol has demonstrated that, such was the importance of high ground; it created a defensive line too large to hold.

Whilst the landscape defined the fortification in Bristol, for Worcester, and Gloucester, the destruction of the suburbs and property to create the necessary 'fields of fire' to stop the artillery of the age, had an immense impact on the landscape and the people that once occupied it.



### ***Author's Declaration***

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

SIGNED: ..... DATE:.....

### ***Dedication and acknowledgments***

I am extremely grateful to my supervisors, Dr Stuart Prior, Dr Neil Carrier and Professor Mark Horton for their support and advice during this project. In addition, I am indebted for all the advice, support and encouragement from Dr Philip Rowe.

I am extremely grateful to Sheena Payne-Lunn, HER Officer for Worcester City Council, who without her, it would have been impossible to write about Worcester. In addition, I am grateful Andrew Armstrong, City Archaeologist for Gloucester City Council and John Rhodes for their advice on Gloucester, along with Peter Insole, HER Officer of Bristol City Council for his assistance on the City of Bristol. Nicholas Hall, Keeper of the Artillery at the Royal Armouries at Portsmouth answered numerous questions. I am also grateful for the assistance of Nick Hannon, Field Technician at the University of Bristol.

I also need to thank the staff of The Hive, Worcestershire, particularly, Lesley Downing and John France, Bristol Record Office and Gloucestershire Archives for their help and assistance. Thanks also to Nick Jones of Full Proof. I apologise to anyone that I have forgotten to mention.

Finally, I would like to thank my family for all their support and particularly my mum, Vanessa Israel. This thesis is dedicated to my beautiful twin sister, Rebecca Israel (14<sup>th</sup>-15<sup>th</sup> February 1985).

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### **Abbreviations**

aOD = Above Ordnance Datum

BRO = Bristol Record Office

c. = circa

d. = died

g = gram

HER = Historic Environment Record

kg = kilogram

km = kilometre

m = metre

cm = centimetre

### **Glossary**

Bastion = A usually symmetrical work protruding from a curtain wall / fortress / fortified town consisting of two faces and two flanks which developed in Italy during the latter end of 15<sup>th</sup> and beginning of 16<sup>th</sup> centuries (Hughes 1974, 237; Harrington 2003, 63)

Battery = A fortified feature from where artillery can be fired from (Harrington 2003, 63)

Circumvallation = Defensive siegeworks facing open land (Harrington 2003, 63)

Contravallation = Siegeworks attempting to stop the passage of a relieving force (Harrington 2003, 63)

Curtain = Main wall of a defensive feature between bastions and / or towers (Hughes 1974, 241; Harrington 2003, 63)

Demi-bastion = shown on plan as consisting of one bastion face and one flank (Harrington 2003, 63)

Ditch = Also known as a graffe it is a dry or wet excavated feature (Hughes 1974, 241; Harrington 2003, 63)

Enceinte = The main line of curtain walls and bastions usually defending a town or city (Harrington 2003, 63)

Flank = A defensive feature linking the curtain wall and bastion that can provide covering fire (Hughes 1974, 242; Harrington 2003, 63)

Gabion = A wicker basket containing earth designed to protect artillery (Hughes 1974, 242; Harrington 2003, 63)

Glacis = A slope on which attackers are exposed to fire from the besieged (Harrington 2003, 63)

Half-moon = Positioned outside the main fortification, crescent shaped but usually consists of two faces forming an angle facing outwards (Harrington 2003, 63)

Hornwork = A sophisticated work consisting of two demi-bastions with a short curtain wall either side; the feature is often connected to the main fort (Harrington 2003, 63)

Orillion = An ear shaped feature providing further protection between the flank and the bastion face (Hughes 1974, 242)

Outworks = A series of fortifications created outside and different to the enceinte (Harrington 2003, 63)

Ravelin = A similar feature to a half-moon but positioned in front of the curtain wall (Harrington 2003, 63)

Sap = A trench (Harrington 2003, 63), mostly small in size

Sconce = A normally detached fortification consisting of bastions (Harrington 2003, 63)

Spur = An arrow shaped feature usually projecting from a curtain wall (Hughes 1974, 243)

## Chapter One: Introduction

### 1.1 Aim of Research

The study of fortifications constructed during the English Civil War (1642–1651) is a neglected area of research. Whilst there has been some examination of the archaeology of the fortifications, such as Harrington (1992, 5) and Foard (2001, 96), the overall perception of the English Civil War (e.g. Gaunt 2003; 2014; Wanklyn 2006; Adamson 2007) focuses on the key battles of the period, namely Edgehill, Naseby, Newbury and Marston Moor.

This is surprising, as over 400 events are recorded as occurring in the 17<sup>th</sup> century, most of which date to the Civil War (**Figure 1**), with 242 sieges occurring in England. The majority, 223, date to the first Civil War (1642–1646), with 19 dating to the second (1648) (**Figure 2**). There was a total of 189 siege sites, with the same positions being attacked on multiple occasions (Foard and Morris 2012, 105, 127). For example, Bristol was besieged twice: once in 1643 and again in 1645.

Whilst existing structures, such as castles, are considered, the aim of this thesis is to archaeologically examine the siting of the fortifications constructed in and around cities during the English Civil War using three case studies: Bristol, Gloucester and Worcester (**Figure 3**). Constructed between 1642 and 1651, these new-style fortifications were based on the *Trace Italienne* developed in Italy and Europe largely in the 15<sup>th</sup> and 16<sup>th</sup> centuries, which were primarily designed to combat the strength and effectiveness of artillery.

In England, these fortifications were, often, hastily constructed earthen bastions connected to ramparts, both of which were formed by the earth dug to create ditches. The generic construction of these fortifications is documented in the contemporary manuals of the period (e.g. Hexham 1637; Norwood 1639; Ward 1639; Papillon 1645; Nye 1670) and in modern literature (e.g. Harrington 2003; 2004; Barratt 2009).

However, the works make limited reference to a fort's topographic/geological setting and do not answer why fortifications were constructed where they were in the contemporary landscape. Avoiding the question of the fortifications' strategic effectiveness, Harrington (2003, 49) notes that "no clear pattern emerges" regarding their success in the landscape. This thesis will therefore address this literature imbalance by investigating the placement of the fortifications in the landscape, analysing their relation to each other and their design.

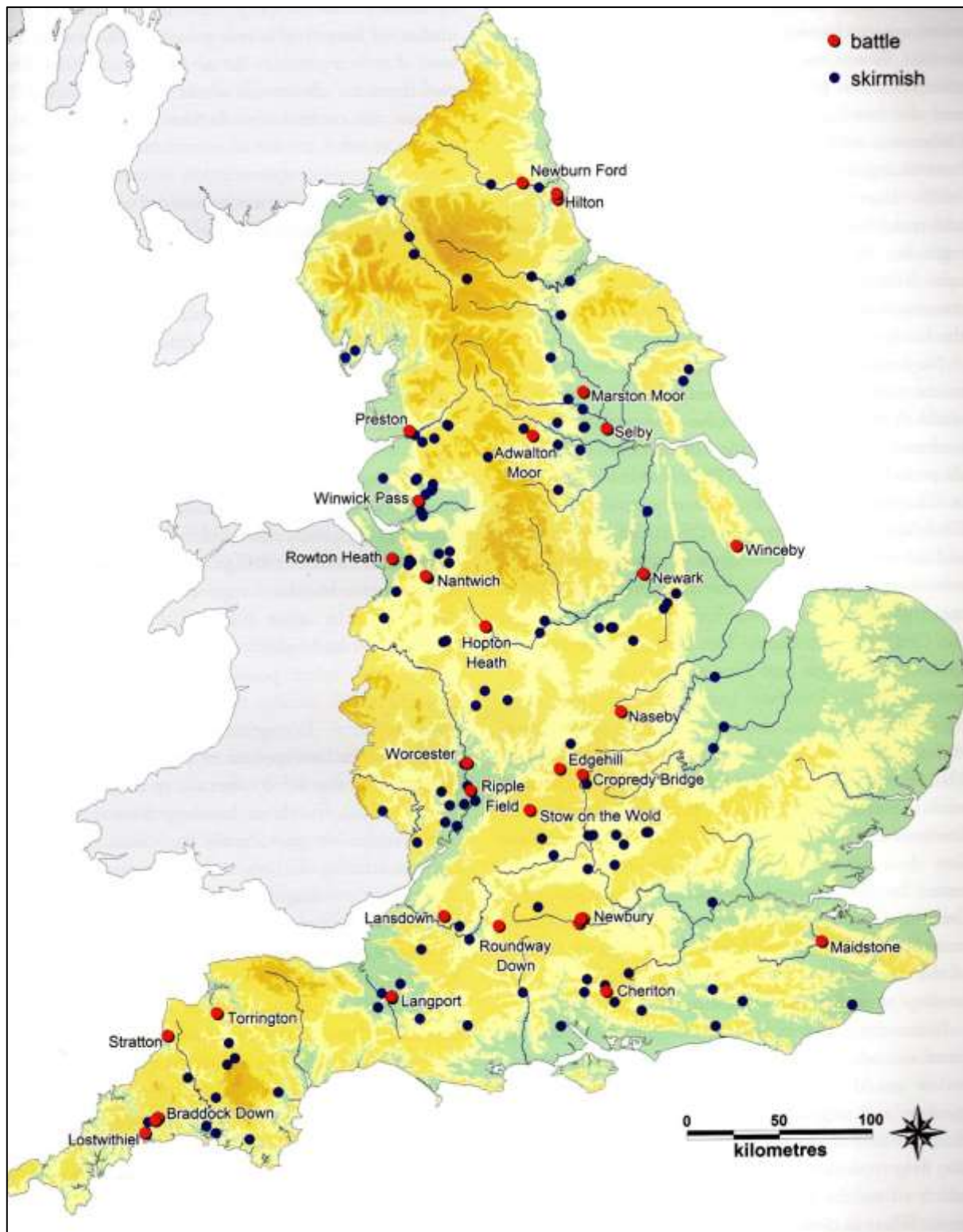


Figure 1: Map naming battles and denoting skirmishes of the English Civil War (1642-51); also include is the battle of Newburn (1640) occurring in the Second Bishops War (Foard and Morris 2012, 107, figure 7.2)

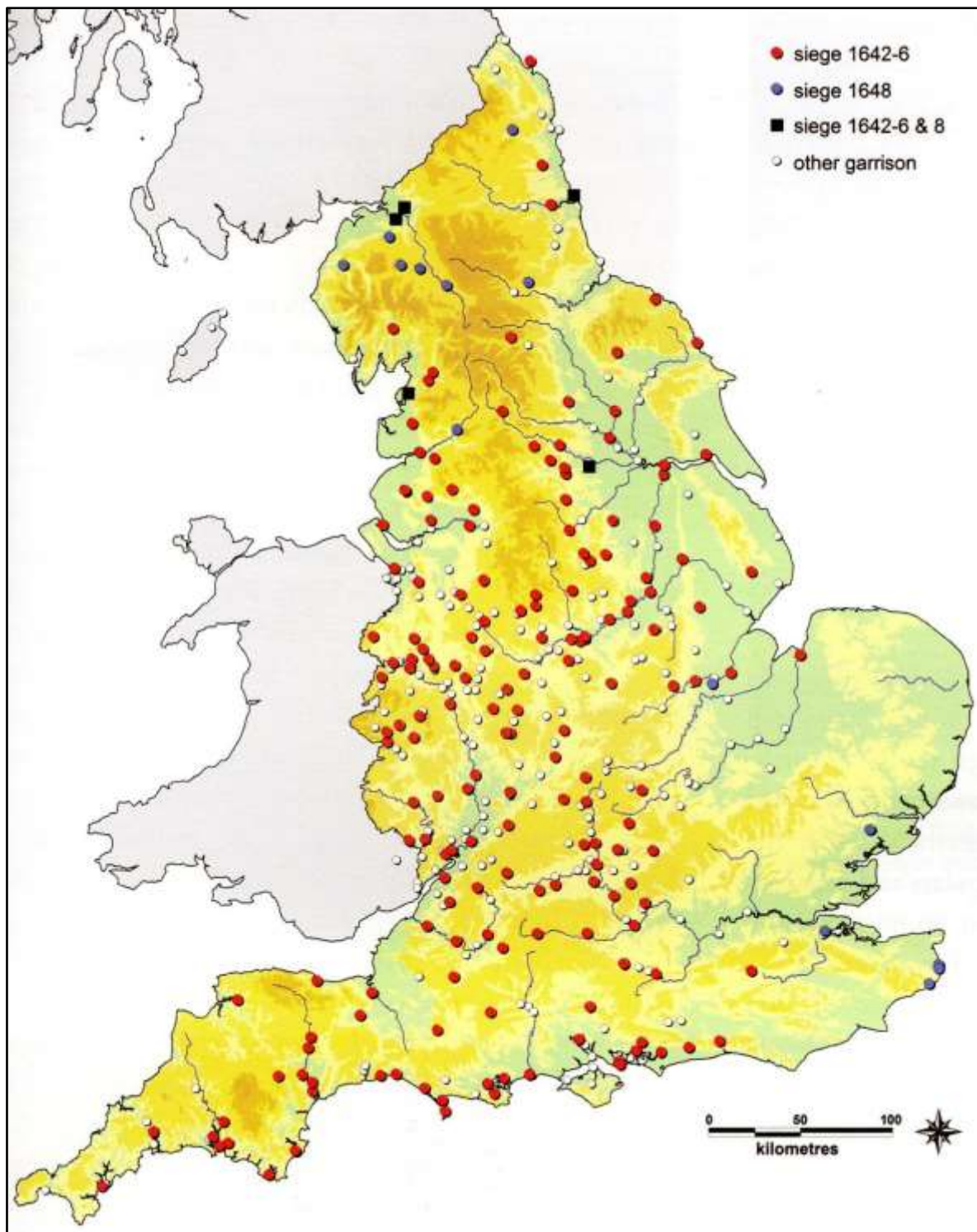
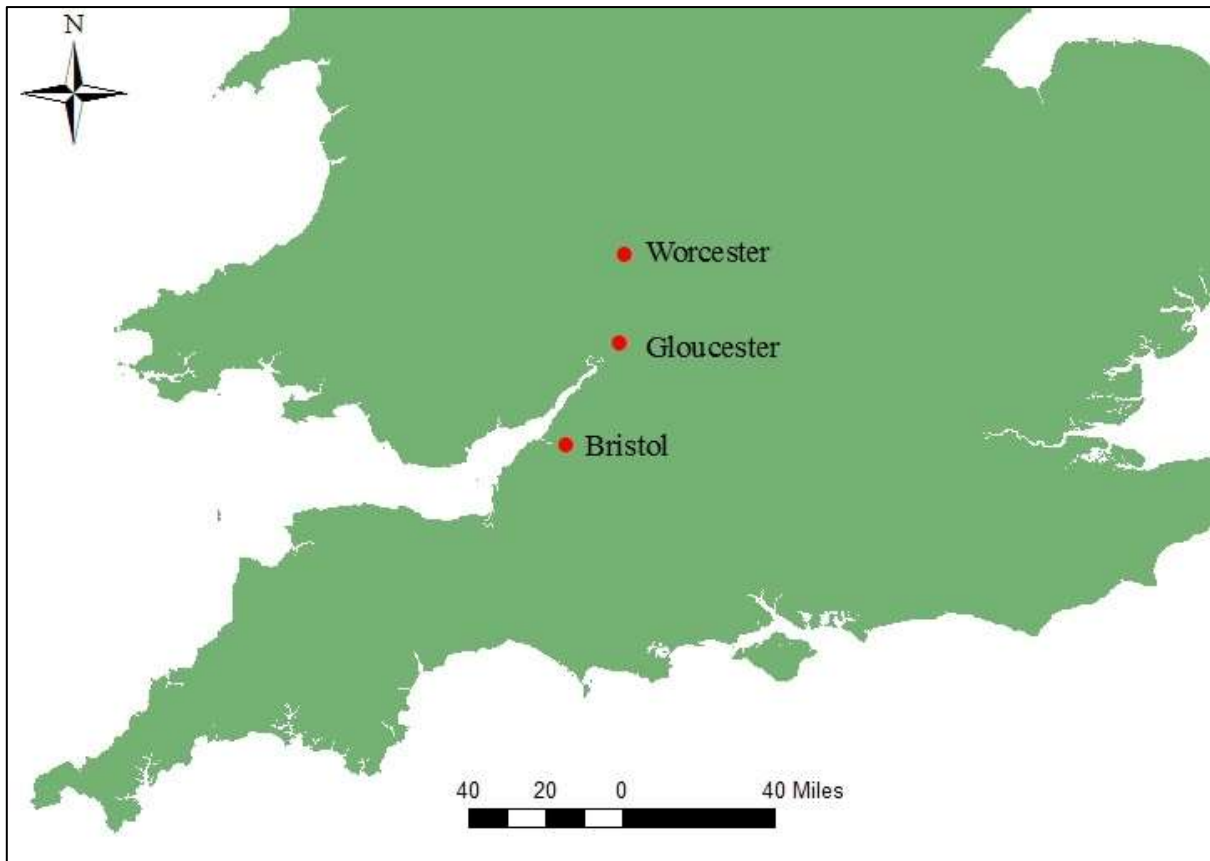


Figure 2: Map showing the sites of sieges and garrisons of England during the Civil War (Foard and Morris 2012, 127, figure. 7.23)



**Figure 3: Map of southern England illustrating the locations of Worcester, Gloucester and Bristol ©Digimap ©Crown Copyright / Database Right 2009, generated in ©ArcGIS 10.2.2**

The lack of research is due, in part, to the rapid removal of the largely earthen fortifications that occurred immediately as the war finished and the expansion of the cities in the subsequent centuries. As Creighton and Higham (2005, 200) note, the Royalist Siege of Gloucester in 1643 involved 30,000 men versus a garrison of 1,500 and lasted just short of a month. Despite over 20 excavations, only limited evidence for this major event has survived in the archaeological record. This demonstrates the ephemeral nature of English Civil War archaeology in the contemporary landscape.

An additional premise is the construction of the fortifications in an urban landscape and the development of these town defences. The towns and cities of the British Isles, save for Berwick-upon-Tweed and some other sites, had no modern defences and had dilapidated walls and infilled ditches. The country was not in a fit state for war. In order for either side to control and maintain their dominance of the resources that each town and city held, it was necessary to fortify them.

## 1.2 Research Questions

In order to address the historical imbalance, this thesis will answer the following research questions:

1. Did the landscapes and cityscapes of the Civil War period influence the design and placement of the fortifications?

The landscapes of Bristol, Gloucester and Worcester had long expanded past their old medieval walls. The focus of this question examines how, if at all, the landscapes and cityscapes influenced the design and placement of the Civil War fortifications. Were design and placement influenced by the existing landscape, and what effect did this have?

2. What impact did the Civil War fortifications have on the landscapes and cityscapes in which they were constructed?

The construction of new fortifications based, in part, on continental designs hurried in new features in the landscapes of Great Britain. This question seeks to explore how the introduction of the fortifications impacted on the landscapes and cityscapes they now occupied.

3. How did the fortifications constructed during the English Civil War differ from the idealised versions depicted in the literature of the period?

It is important to understand and appreciate the key sources of information, the historical record and the archaeological record, but how did the fortifications examined through archaeological excavation diverge from the military manuals of the period? The importance of this question examines what was built and how it differed from the literature when encompassed within the landscapes and cityscapes the fortifications were constructed in.

4. What is the legacy of English Civil War fortifications in the contemporary landscape?  
How are they perceived and cared for in the modern era?

This question evaluates the surviving elements of the Civil War fortifications in the modern landscape. What do the fortifications represent, and how are they maintained in the contemporary landscape? The importance of having a legacy is essential when attempting to fully understand and appreciate the role that the fortifications played in a major event of the 17<sup>th</sup> century that has had lasting consequences.



### **1.3 Previous Research and Literature Review**

This research has developed from the author's undergraduate and master's dissertations focusing on the fortification of the Royal Fort in Bristol and what the exact nature of the fortification was in Gloucester (Israel 2008; 2009).

The undergraduate thesis focused on the Royalist fortification of the Royal Fort constructed in Bristol. Through analysis of topographic, cartographic, historical and archaeological information, a new potential location for the fortification was examined. In addition, analysis of the fortification's position in the landscape was undertaken utilising geographical information system (GIS) viewshed analysis.

The postgraduate thesis examined the role of the fortifications of Gloucester, specifically whether the forts were positioned for strategic purposes or the suppression of the populace inside the city. It concluded that the fortifications were constructed for strategic control of the city; however, their overall function reflected the economic, social and political nature of a Civil War.

Neither thesis fully addressed whether the landscape influenced the design of the fortification(s), the impact of the fortification(s) on the landscape and how accurate the construction of the fortification(s) was to the literature of the period. Therefore, various issues still require analysis in order to fully understand and appreciate the construction and manning of the fortifications and the impact that they had on landscapes, cityscapes and ultimately the Civil War itself.

#### **1.3.1 History of Examination**

Overall, the study of fortifications has long been dominated by the examination of medieval castles and to a lesser extent by Napoleonic, Palmerston, and First and Second World War features, but little archaeological attention has been given to the English Civil War.

However, almost immediately after the Restoration, examinations were being made of Civil War sites. Staynred published his plan of the Royal Fort of Bristol in 1678; Archer, a surveyor for the Royal Engineers, noted the Royalist sconce in York in his plan of the city in 1682. William Stukeley examined the same feature in 1725 and produced a plan of the Civil War defences of London; Colt Hoare described the site of a possible battery in Market Lavington in Wiltshire in 1812 (Harrington 1992, 11; Flintham 2008, 37).

One of the earliest examinations of the Civil War was conducted by Ross (1887). In it, he examines the military engineering techniques of the ages, including French and Dutch designs, the artillery train, and ordnance pieces of the period. In addition, Bristol, Oxford,



London, Kingston-Upon-Hull, Portsmouth, Reading, Plymouth, Liverpool, Newark and Worcester, amongst others, are examined (Ross 1887, 89, 93, 94, 102, 115, 138, 150, 160, 202–205). What the work does not examine is why the fortifications were constructed in their specific positions and what impact that had on the design, if any.

One of the most prominent authors on the subject is Peter Harrington, whose (1987) examination of English Civil War fortifications notes the surviving features, sites that were adapted, sites involving masonry and excavated sites, as well as providing a gazetteer of Civil War earthworks.

Harrington (1992, 7, 10, 15, 25, 27–30, 37–38, 43, 47–49) focuses on the archaeology of the Civil War whilst classifying sites into four main types:

1. Castles and fortified houses

This section includes the fortification of country houses, such as Lathom House in Lancashire, Basing House in Hampshire and Wiverton Hall near Newark in Nottinghamshire. It also examines the re-use of castles including Dover, Deal, Sandown and Walmer in Kent; Pendennis and St Mawes in Cornwall; and Farnham in Surrey.

2. Town defences

Throughout the country, towns and cities had defences added to existing features, including the re-use of Roman and prehistoric sites. This included fortifications in London, Liverpool, Chester, Plymouth, King's Lynn, Shrewsbury, Hull, Taunton, Devizes and Reading. Many sites were destroyed soon afterwards because peace had returned, combined with the fact that Parliament feared sites being used for revolt during the Commonwealth period.

3. Siegeworks and forts

Connected to town defences, the surrounding siegeworks and fortifications have largely been destroyed; however, some (such as those at Raglan Castle, Gwent; near Lichfield Cathedral, Staffordshire; and in meadows near the River Dee in Chester) survive. Independent fortifications, such as Horsey Hill and Earith in Cambridgeshire, have also survived.

4. Other sites and evidence

The south-west of England was the scene of various islands and coastal fortifications, including Lundy Island near the Bristol Channel and off the north coast of Devon, which contained three

batteries. The Isle of Man between Britain and Ireland was also fortified, along with the Isles of Scilly off the Cornish coast.

Earlier sites of occupation were also re-used. A prehistoric earthwork in Castle Hill near Newark in Nottinghamshire, an Iron Age hillfort at Castle Dore in Cornwall and the Maumbury Rings in Dorchester, Dorset, are a few examples.

### **1.3.2 Archaeological Rebalance**

However, Harrington's (2003) book highlights some outstanding issues in the subject matter. Whilst the work discusses major developments in design, the materials required, and defensive and offensive fortifications, it is largely a historical narrative of the period and does not analyse why fortifications were constructed in their positions, except for the fact that they were surrounding major cities, such as Bristol and London. Perhaps most importantly, Harrington (2003, 49) states that it is difficult to examine the usefulness of the fortifications. However, no archaeological evidence is examined in this book, except a brief mention that excavations have been undertaken at Basing House in Hampshire (Harrington 2003, 60).

Hutton and Reeves' (1998) chapter specifically focuses on fortifications and sieges and examines cities and towns including London, Exeter, Newark and Colchester. However, this work focuses purely on historical evidence, and no archaeology is examined. Similarly, Young and Emberton's (1978) book is a work primarily based on historical documents and the analysis thereof. The historian Flintham has written extensively on the fortifications of London during the Civil War, with one article focusing on Whitechapel. The paper is largely a historical analysis of the area, although the author notes that only two archaeological excavations have been undertaken: in 1992 and 1994 (Flintham 2007, 110). A similar pattern develops with Hyde Park and St George's Field Fort, with the latter only having one archaeological mention in the shape of one sentence (Flintham 2010, 12). An article written by Smith (1997) titled *The Defences of London During the English Civil War* makes no reference to archaeology. It is clear from these works that archaeology takes a backseat to the historical document. The above analysis is by no means meant as a criticism of the above works, merely a reflection on the current status of Civil War archaeology. This evidence also highlights the nature of examining the defences constructed in an urban environment and the problems associated with urban archaeology. This suggests two things:

- i) That there is insufficient interest from an archaeological perspective in the period;  
and
- ii) The archaeology may be too ephemeral for archaeologists to locate.

There has been some focus on the English Civil War in the overall field of post-medieval archaeology. Crossley (1990, 113, 115, 117) notes the lack of surviving features throughout the country due to development and erosion because of the earthwork nature of the fortifications. The focus moves to William Stukeley's plan of the defences of London and an analysis of his attempt to plot the defences of Oxford. Attention is drawn to the study of the earthworks in Newark-upon-Trent, with a comparison to a feature in Caerphilly in South Wales. A brief discussion explains siegeworks, adapting existing defences and the slighting of castles.

Another generalised discussion of post-medieval archaeology briefly mentions the Civil War and the fortifications, combining it with research into the 18<sup>th</sup> century. It notes the destruction caused by the development of defences, moving on to an examination of the defences of Berwick-upon-Tweed. A final brief section focuses on Bristol and Gloucester, noting how a city with the prestige of Bristol was able to have additional defences and the existing ones restored; by contrast, the discussion of Gloucester mentions the destruction of suburbs and the discovery of ditches through archaeology (Newman *et al.* 2001, 138–140).

An edited volume with the main title *Post-Medieval Landscapes*, whilst focusing on theory, rural and urban landscapes, and perception (Barnwell and Palmer 2007), fails to contain an article focusing on the effect of the Civil War on the post-medieval landscape. Another volume, with the main title *Landscapes of War*, focuses on the castles of Henry VIII and bypasses the English Civil War completely by moving on to Napoleonic defences (Hill and Wileman 2002, 126–130).

In contrast, significant attention has focused on Newark-upon-Trent, with numerous investigations, including Barley (1957), Manning (1958), the Royal Commission (1964), Dean (1968) and Drage (1987). In addition, the town has received several mentions in *Casemate* produced by the Fortress Study Group, for example Flintham (2013; 2017), with the latter publication focusing on the creation of a National Civil War Centre in Newark itself. The fortifications of Newark-upon-Trent are important because they are some of the best-preserved features surviving into the modern landscape and visually demonstrate what was constructed.

The archaeology of the Civil War is somewhat explored by Courtney (2001) when analysing the early modern siege, noting the hurried nature of defences, using earth and timber, and some utilisation of military engineering from the continent. The work focuses on the artillery of the age (specifically the mortar) and the construction and demolition of fortifications, additional defences and siegeworks. In addition, small case studies, including Exeter, Newark and Gloucester, are examined (Courtney 2001, 105–107, 109–111).

One recent important work is Osborne's (2004) study, which compiles a directory of siege techniques and engineers and a gazetteer of sites. Whilst this is an important work, for example noting the destruction of the landscape (Osborne 2004, 21), there is little focus on the effect of the landscape on the fortifications or why the fortifications were placed where they were.

The importance of castles utilised during the Civil War has been examined, despite the focus of this thesis on the *Trace Italienne* fortifications. Archaeological excavations at Sandal Castle, Yorkshire, revealed important evidence of military finds, pottery and coinage following the refortification of the site by the Royalists and a brief siege in 1645 (Butler *et al.* 1983, 29). The importance of assemblages is further underlined by Askew's (2016, 53–54, 62) analysis of the castle, noting the importance of the material culture uncovered at a site that was not significant militarily or strategically.

Excavations at Beeston Castle, Cheshire, revealed evidence of fills containing charcoal, soil and clay near an aperture that could have housed a gunport. Other areas revealed postholes (indicating gatehouse division) and altering of the topography to drain areas to accommodate soldiers (Ellis 1993, 120–122, 126).

Excavations of the Master Gunner's House of Scarborough Castle, North Yorkshire, revealed evidence of the infilling of the inner bailey ditch to the curtain wall to assist with garrisoning the castle dating to the 17<sup>th</sup> century (Hayfield and Pacitto 2007, 195, 228), whilst excavations in the 1980s at Pontefract Castle, Yorkshire, revealed that there was difficulty in locating any evidence of artillery in the archaeological record, despite its role in the three sieges (Roberts 2002, 431).

Evidence shows that a Civil War redoubt was constructed by the Royalists near Caerphilly Castle during 1642–1643. However, the feature was not constructed to defend the castle but to prevent Parliament from securing the fortress (Spurgeon and Thomas 1998, 192).

Archaeological and architectural evidence is providing reinterpretations of traditional accounts of the effects of the Civil War on castles. For example, at Carew Castle in Pembrokeshire, it was long thought that a 'field of fire' for artillery was created by destroying the Outer Ward; however, re-analysis now suggests that the Outer Ward was an integral part of the castle's defences during the conflict (Gerrard 1990, 49).

Wiggins' (2001) analysis of the Siege of King John's Castle in Limerick, Ireland, in 1642 provides an interesting parallel to sieges conducted during the English Civil War. The work focuses in large parts on the mining and countermining that occurred, with some mention

of why Limerick and the castle were important for strategic and economic reasons (Wiggins 2001, 2–3); however, there is no focus on how the landscape impacted on the events.

The role and functions of the castle continued to change; for example, Bristol Castle, although still significant, took on a different role to the one it had under Robert of Gloucester during the earlier Civil War in the 12<sup>th</sup> century between Stephen and Matilda (Bradbury 2005, 63).

### **1.3.3 Recent Academic Works**

Rakoczy's (2007) PhD focused on the use of medieval castles during the period. A small brief section examines the role of artillery but largely refers the reader to earlier works (Rakoczy 2007, 82–3). The lack of focus on the artillery of the age suggests that the weapon is perhaps seen as a footnote to the wider picture. However, it is suggested that when studying the Civil War, greater attention must be paid to the artillery of the period to understand why specific sites, including towns and cities, were (re)fortified.

Foard's (2008) PhD thesis focuses on an examination of the battlefield of the Battle of Edgehill in 1642. The study provides an important examination of a battlefield and a significant methodology to utilise when examining 17<sup>th</sup>-century conflict.

Askew's (2013) PhD re-examines the role of the castle through the archaeological assemblage. The work plays an important role in identifying and examining the re-use of the medieval castles in Eccleshall, Sandal and Pontefract (Askew 2013, 113, 145, 177) during the Civil War – a subject that requires further examination.

## **1.4 Case Studies – Reasons for Selection**

The case studies of Bristol, Gloucester and Worcester have been chosen, in part, due to their geographical relationships. Noted as part of the Severn Valley, the towns and cities of the River Severn, if Bristol is included, encompassed a region that was the communication and trading centre from the West Country to North Wales. As Roy (1978, 133) discusses, the region showcased “the impact of the war at its greatest”. The area containing the Upper Severn produced iron, corn and coal, which were transported to the ports of Bristol and Gloucester, with the River Severn being second only to the Maas River, which had the most traffic in Europe (Roy 1978, 133).

Due to their placement in the landscape, all three cities were vital to the war efforts of both sides. As Prior (2006, 62–63) discusses, cities are important administrative, commercial and manufacturing centres, which are essential strategic requirements for winning a

campaign/war. In addition, all three cities had fortifications constructed and were involved in siege(s); therefore, the placement and construction of the fortifications in these locations make them ideal for study, as their placement can be tested to see if they were positioned in suitable locations.

#### **1.4.1 Bristol**

The city was vital to both the Royalists and the Parliamentarians. It held a strategic position in the landscape, with routes to London, Gloucester and Wales. An administrative and manufacturing centre, the city had access to a coalfield in Kingswood, iron and charcoal from the Forest of Dean, and copper and lead from the Mendips. Vital to trade was the port of Bristol, which was central to the Royalist war effort, as they relied upon, to some extent, troops from Ireland. The port itself had continued to grow from the 16<sup>th</sup> century (Lynch 2009, 9–10).

#### **1.4.2 Gloucester**

The city of Gloucester was also situated in a strategic position, with major routes to Worcester, Shrewsbury, London and Oxford, in addition to access to the River Severn. Iron and timber from the Forest of Dean was sent to Gloucester, the centre of manufacturing and agricultural products (Atkin and Laughlin 1992, 13).

#### **1.4.3 Worcester**

Worcester, like the county itself, was of vital strategic importance, as it had routes in all major directions and was a source of gunpowder. Utilising the River Severn, which was an essential trading route of the country, it carried materials such as cheese, salt, lead, timber and iron ore to and from the city. In 1637, the River Avon was made navigable, threatening the River Severn's importance as a major trade route, at which the city of Worcester protested, as the development would impact on its trading might (Atkin 1995, 5, 8–9).

### **1.5 Structure of the Thesis**

The second chapter focuses on the methodologies employed to examine the three case studies, including geological, cartographic and topographic research. The chapter provides overall context and background to the Civil War, examining the status of Bristol, Gloucester and Worcester before the outbreak of war. Finally, the chapter studies the position of the Civil War in the discipline of archaeology and in the sub-disciplines of post-medieval archaeology, post-medieval landscapes, battlefield archaeology and conflict archaeology.

The third chapter examines the development of town defences in England and the arrival of the *Trace Italienne* style of fortifications. The chapter gives a brief overview of the sieges and the defences constructed during the war and examines why it was important for the Royalists and/or Parliamentarians to hold Bristol, Gloucester and Worcester for their respective sides.

The fourth chapter focuses on the fortifications of the English Civil War, examining the intricate parts that make up the features. It examines key aspects, including bastions, flanks, ramparts and ditches. The chapter also examines the weaponry of the period.

The fifth, six and seventh chapters focus individually on Bristol, Gloucester and Worcester. Each chapter provides an overview of the events that occurred for the case study. Analyses of the topographic, geological, historical and cartographic information available, as well as the GIS viewshed analysis of the artillery positioned on the fortifications and a discussion of the surviving and destroyed features and the legacy of the Civil War fortifications, are examined.

The eighth chapter involves a discussion of the evidence examined, specifically comparing the archaeological evidence of each case study, in addition to comparing the research to the wider context of continental Europe.

## **1.6 Pre- *Trace Italienne* Fortifications**

Writers such as Ward (1639, 2) and Papillon (1645, 4) had an appreciation of the fortifications constructed by earlier societies and civilisations. Whilst the introduction of artillery appears to have forced the creation of bastions and new fortifications, the Nubian fortifications of the Middle Kingdom of Ancient Egypt (3000–1780 BC) achieved a level of sophistication “that cannot be found anywhere in Western Europe before the Early Modern period” (Vogel 2010, 17–18), which also contained bastions, glacises and ramparts with surrounding ditches (Vogel 2010, 22). Thick ramparts in Hattusha built by the Hittites of Central Anatolia c. 1650–700 BC contained one rampart known as the ‘Yerkapi Rampart’, which was 250m long and 80m thick (Nossov 2008, 4, 21). The Ancient Greeks built significant fortifications, with the fortification of Mycenae being built around 1500 BC utilising the natural topography of the hillside and a massive masonry wall with a two-gateway system and a ramp to approach the city, passing through the Gate of the Lions to the acropolis. The defensive walls followed the ridgeline. Roman legionary fortresses started with a square or rectangular enceinte with walls, at times containing towers with gateways supported by two towers and casemates. Additional support was provided using turf, which was bounded to logs, and ditches contained a counterscarp

(Hughes 1991, 10, 17). The introduction of the castle with a motte construction utilising an artificial or natural mound with ditch and timber palisade, later timber and stone fortifications (Hislop 2016, 10, 29, 54), represents the final evolution in fortifications until the introduction of the *Trace Italienne* features.

The above evidence has demonstrated that throughout history and across different continents, humans have undertaken extraordinary lengths and endeavours towards defending a location and about the nature of warfare. Whether it was the Ancient Egyptians, the Hittites, the Greeks or the Romans, fortifications were significant features in the landscape. Control of the area required the utilisation of natural topographic features and significant resources, such as stone, to create ramparts and to excavate ditches. The nature of warfare demanded control of the high ground, the ability to defend against a mobile target (e.g. chariots) and large fortifications from which to defend against an impending assault.

## **1.7 Summary**

Having identified issues regarding the placement and construction of fortifications of the English Civil War period, despite numerous examinations of the period, questions remain. It is important to understand and appreciate the effects that the battles had on the outcome of the conflict; however, it was the struggle and competition for resources that ultimately dictated where and why the key battles took place and ultimately shaped the outcome of the Civil War.

The results of this conflict continue to be seen in the landscapes of the towns and cities throughout the land. The next chapters aim to illuminate the effects that the fortifications had not only on the landscapes but also on the fabric of society itself.



## **Chapter Two: Methodology**

### **2.1 Introduction**

The purpose of this chapter is to demonstrate how the research questions posed within the introductory chapter can be critically interrogated, in order to provide answers based upon thorough analysis of the evidence available.

The research methodology focuses on understanding the geology, cartographic resources, topography, ‘grey’ literature, published works and GIS research. It also provides a background to the Civil War, the status of the three case study cities and context as to how the west of England was affected by the conflict. Finally, an examination of where the English Civil War is positioned within the discipline of archaeology is discussed.

### **2.2 Research Methodologies**

The following landscape archaeology research methodologies have been chosen in order to fully examine and interrogate the research questions.

#### **2.2.1 Geological Research**

An understanding of the geology that a fortification was constructed on is essential to determine how much the landscape influenced the fortification’s design, construction and placement. This knowledge can also determine how closely, if at all, the fortifications constructed followed the guidelines set out in the literature of the period. This analysis has not been conducted on static features dating to the Civil War, although some investigation of battlefields has been conducted, including Lansdown (1643), Naseby (1645) and Dunbar (1650) (Halsall 2000, 48–56).

#### **2.2.2 Cartographic Research**

The cartographic resource is an important tool for archaeologists. This is because it is often the first visual representation of the layout of a town. It can help to explain why fortifications were sited in locations and what impacts the fortifications had on the landscapes and cityscapes they were constructed in. Relevant maps of Bristol, Gloucester and Worcester, pre-, post- and during the conflict, if they exist, will be examined. The main resources are EDINA Digimap (<https://digimap.edina.ac.uk>) and maps contained within the Bristol Record Office, the Gloucestershire Archives and The Hive in Worcester.

Analysis of the First-Edition Ordnance Survey Map, 1:10,560 scale (six inches to the mile), mid- to late 19<sup>th</sup> century, will also be conducted. This is because the early Ordnance Survey maps are in some cases the earliest reliable maps of an area, and, according to Aston (1985, 18), the Ordnance Survey map “really is the best basis for fieldwork”.

### **2.2.3 Topographic Research**

Using the information gained from analysis of the cartographic sources, the topography will be examined. An understanding of the topographic positions of the fortifications can help to determine why the fort was sited in that locus. Was it because it was on top of a hill and therefore provided a good vantage point to spot approaching armies? Alternatively, was the fortification positioned next to a river? Having answered these rudimentary questions, the knowledge gained from this research can help to explain if the landscape/cityscape influenced the design and placement of the fortifications.

### **2.2.4 ‘Grey Literature’ Research**

‘Grey literature’ evidence is an important and underused resource. It consists of the results of desk-based assessments and the watching briefs and evaluations produced by archaeological units, primarily in response to satisfying part of planning conditions. Initially, examination involved scrutinising the online resources for Worcester Historic Environment Record ([www.heritagegateway.org.uk](http://www.heritagegateway.org.uk)), thereby contacting Historic Environment Record Officer Sheena Payne-Lunn and Archaeological Officer James Dinn for further information and reports. For Bristol, contact with Bristol Historic Environment Record Officer Peter Insole and examination of the ‘Know Your Place’ ([www.bristol.gov.uk](http://www.bristol.gov.uk)) website containing reports were made. Gloucester City Archaeologist Andrew Armstrong was contacted directly for reports relating to that city.

### **2.2.5 Published Research**

An examination of the published research pertaining to the period will be undertaken, focusing on the published works for Bristol, Gloucester and Worcester (e.g. Atkin and Laughlin 1992; Atkin 1991; 1995; 2004; 2008; Lynch 1999).

The following material, based in part on Foard’s (2008) research methodology, will be examined, where applicable:

1. Primary documents – accounts of events – who, why, what and where

This is the basic requirement that an archaeologist can ask of any historical document. What is its authenticity – how reliable is the document to the research being conducted? Any relevant documents written during the Civil War in relation to the case study sites will be examined. Primary accounts of Bristol include de Gomme’s evaluation of the city’s defences in 1643 and 1645 (De Gomme 1925, 180–203; De Gomme 1645, 9–10). In Gloucester, Town Clerk John Dorney (1643) and Corbet (1645) provide accounts of the 1643 siege. Henry Townshend compiled a diary of the Siege of Worcester in 1646 (Willis Bund 1915, 99–197). These primary sources will provide vital evidence as to what fortifications were constructed, where they were constructed, their condition and what other materials/resources were present during the period.

## 2. Military practice of the period – examining military manuals

The literature of the period forms a key element of understanding the mindsets of the engineer and the gunner during this era. These will be analysed to form a basis for comparing the extant works to the results of excavations to see how much, if at all, the historical record differs from the archaeological one. The works of Papillon (1645), Nye (1670), Norton (1628), Hexham (1637), Cruso (1644), Ward (1639), Smith (1600), Eldred (1646), Norwood (1639) and Stone (1645) are examined to understand how the engineers and gunners of the day understood their fields of expertise.

### 2.2.6 Site Analysis

All sites visited will be photographically recorded, along with rapid walkover surveys combined with notes of key features. Walking the cities is vital to understand the context of where the fortifications were placed. Despite the expansion and development of the towns over the centuries, an appreciation of the early post-medieval landscape can be discovered by walking the current landscape.

The following factors will help to determine whether the fortifications were sufficiently sited in the landscape:

1. High ground – provides natural protection from enemies; dominates the immediate hinterland and offers intervisibility between separate fortifications (Prior 2006, 53).
2. Valley passes – a “pivotal point” (Prior 2006, 55) where a fortification should be sited so that it commands defensive and aggressive roles. An example of a defensive role is allowing safe passage for troops to move safely around, whilst an aggressive role is being able to observe and launch attacks on the enemy (Prior 2006, 55–56).

3. Supply routes and supplies – providing the necessary equipment and supplies for a garrison/army is an obvious necessity, as is limiting the enemy's resources. By constructing a fortification near a road/river, it would enable supplies to be brought to and from the fortification whilst limiting these supply routes for the opposition (Prior 2006, 56), thus providing key strategic and tactical advantages.
4. Communication lines – a fortification constructed near a single road or river held an advantage over a small area. Where a fortification was constructed at a junction of important routes, its influence spread over a larger area; this was increased even further if two or more fortifications acted together (Prior 2006, 58).
5. Rivers – as illustrated by points three and four, rivers held strategic significance. Control of rivers can not only can block enemy supplies but can also command nearby roads and bridges. Rivers can also provide an additional defensive role (Prior 2006, 58–59) (e.g. flooding a moat or ditch with water).
6. Water supply – a pure water supply is essential for maintaining a healthy fighting force and livestock. A lot is required; for example, 20 men who each have a horse would require approximately 300 gallons a day. Water is essential in both tactical and strategic planning (Prior 2006, 60–61).
7. Woodland – wood is essential for constructing buildings and for fuel; however, careful consideration must be taken when deciding how close to site a fortification near woodland – too close and it would be a strategic and tactical disaster, as a woodland or forest is an ideal place for the enemy to launch an attack from (Prior 2006, 62).

By combining all the above research strands in conjunction with viewshed analysis, we can determine fields of fire for the artillery of age. Similar although unconnected research has been undertaken by Paton and Cook (2016). They examined the positions of the fortifications in 16<sup>th</sup>-century Leith but not the fields of fire of any artillery. The article rephased some of the existing dates of the fortifications from the 1540s to the 1650s and the arrival of Oliver Cromwell whilst at the same time proposing new positions for the fortifications (Paton and Cook 2016, 269, 276).

### **2.2.7 GIS Analysis**

Integral to this thesis is the use of GIS analysis, or geographical information science. These broad series of programmes are used to analyse spatial data (Chapman 2006, 9, 14) and, in this case, to conduct viewshed analysis (intervisibility) of the positions of fortifications and the

artillery pieces mounted upon them. Depending on the position and artillery available, several viewsheds will be conducted. This is essential to “justify any claims that sites are preferentially located with respect to their visual affordances” (Conolly 2008, 589).

Intervisibility is determined between the viewpoint and the target. If the target is lower than the viewpoint, then it will be intervisible; this is obviously dependent upon the topography of the intervening landscape (Conolly and Lake 2006, 225–226). To do this, a cumulative viewshed will be utilised, as this calculates the “number of “times seen” of a given location” (Conolly 2008, 590).

There are two theoretical concerns with intervisibility: the algorithm and the earth’s curvature. The algorithm issue is that different software has different algorithms for calculating intervisibility; even using the same data, different programme arrives at different outcomes. As the earth’s surface is not flat, its curvature affects the viewshed result by around 7.86m per 10km (Conolly and Lake 2006, 228–229).

Spatial data is not new to archaeologists. Data collected in excavations and earthwork surveys must be tied into a co-ordinate system. This is even truer for landscape archaeologists, as place and location are central to the discipline (Wheatley and Gillings 2002, 3). However, as Gillings and Goodrick (1996, 1.2.1, [intarch.ac.uk](http://intarch.ac.uk)) note, “Space is very much taken for granted and treated as a neutral background with no cultural value.” What this suggests is that the platform, the blank page that archaeologists start with, is not considered. This is something that will be avoided by examining the pre-existing landscape. Space and scale are components that when divided become planned and become entangled in a larger, more complex landscape (Bender 1993, 4). This is what happens when that space is manipulated in GIS – it fits the view and the scale that the programmer decides.

When working with GIS, the landscape is often seen on a macroscale. The macroscale affects how visibility is analysed, which is essential when examining the cumulative viewshed data (Trifković 2006, 261–262). The viewshed analysis tool can also be used to examine the theoretical viewpoint of post-processual landscape archaeology (Chapman 2006, 135). The importance of scale at a ‘local’ level is an essential criterion with ‘large’ scale data being interpreted as 1:24,000 (Sydoriak Allen 2000, 107).

It is important to question, how and if, GIS helps archaeologists understand how people in the past experienced history. Is seeing the landscape depicted on a map more important than smell or touch, or does it demonstrate another avenue of thought? It is also necessary for the archaeologist to try and not to base all their information on the cartographic representations presented in the GIS programme (Hacıgüzeller 2012, 249-250, 253). The comparison and

correlation of data remains the primary approach of this map-based analysis of spatial archaeology (Lock and Harris 1992, 82-83). The landscape is no longer a distant place but an important criterion for groups and the individual (Lock 2003, 175).

#### **2.2.7.1 GIS Viewshed Analysis and This Thesis**

Some recent PhD studies utilised GIS viewshed analysis as a tool or a main theoretical paradigm, such as those of Rowe (2014) and Veninger (2015). Rowe's work attempts to analyse the effectiveness of a created landscape against a theoretical battle (i.e. Stop Line Green and Outer Bristol against a land invasion by the Nazis), whilst Veninger's work attempts to determine the locations of battles in the 12<sup>th</sup> century. However, when analysing the sieges and battles of Bristol, Gloucester and Worcester, there are no questions to answer of where and when the events took place.

Lacey's GIS-based fire-shed analysis (2003) examined the placement of Second World War pillboxes and other emplacements in the landscape to establish whether the features were strategically sited. Employing his fire-shed model, similar spatial analysis will be utilised by this thesis to answer the first, second and third research questions. The fire-shed analysis will, utilising the historical information contained in the military manuals, determine the effectiveness of artillery based on the locations of the fortifications. The radius, the "field of fire" (Lacey 2003, 48), of the artillery will, in part, determine whether the artillery and, ultimately, the fortifications were sited in effective positions.

The use of contour and geological data in this examination emphasises the importance of these features (Gillings 2012, 608) when analysing the position and potential effectiveness of the artillery and thereby the fortifications in landscape. The importance of the environment, in this case the landscape that the fortifications and artillery were sited in, cannot be underestimated, as is an understanding how this affects the visual sense (Hu 2012, 82) of how people in the past saw their landscape.

Underpinning the use of GIS and the analysis of the viewsheds is terminology. Categories such as "state" and "city" help archaeologists understand the use of space and organisation. This is an important development as to characterise spatial areas shows how society evolves overtime (Hu 2012, 86).

However, why the fortifications and artillery were sited where they were and their effectiveness in the landscape are in debate. With answers to these questions having been discussed and demonstrated utilising the geological, topographic and cartographic information

available, the use of GIS adds a further dimension and provides further evidence to explain the primary elements of this work, the English Civil War and the landscape.

### **2.2.7.2 GIS Settings**

To conduct the research, the following methodology, initially in ArcMap 10.2.2 and finally in ArcMap 10.5.1, was utilised. The discussion of the background datasets below is based on Partida (2011, 1-4).

- i) An initial basic MasterMap, 1:10,000, raster TIFF format, was downloaded from the EDINA Digimap website (<http://digimap.edina.ac.uk>). For Bristol, Gloucester and Worcester, the data was from May 2017. These maps provide a basic outline of the current landscape, from which some georeferencing of cartographic sources is useful.
- ii) In addition, the 1:10,560 First-Edition National Grid Map in TIFF format was downloaded from the EDINA Digimap website for Bristol, Gloucester and Worcester. The earliest Ordnance Survey maps provide a useful basis in conjunction with the MasterMap source from which to georeference some of the cartographic sources.
- iii) The OS Terrain 5 DTM of 1:10,000 scale was also downloaded from the EDINA Digimap website. For each case study, the data dated from October 2017 and was supplied in ASC format. The reason for choosing the OS Terrain 5 DTM was because it was recommended by EDINA Digimap as the most suitable to perform “local viewsheds” (EDINA Digimap <http://digimap.edina.ac.uk>), in addition to helpful advice from Dr Philip R. Rowe (2016, pers. comm., 6<sup>th</sup> April) and Nick Hannon, Field Technician, Department of Anthropology and Archaeology, University of Bristol (2018, pers. comm., 11<sup>th</sup> January), who believed that this was the best method for this research. Viewsheds were performed using the DTM (Digital Terrain Model) data for each city. For Worcester, it was necessary to merge four ASC (.asc) files by creating a mosaic dataset and a geodatabase (.gdb) file from which to perform the viewsheds. This was not necessary for Bristol and Gloucester as the viewsheds were performed via one DTM dataset for each case study.
- iv) Geological data for all three case studies was downloaded from the EDINA Digimap website via the British Geological Survey. For Bristol and Worcester, the scale was 1:10,000 shape (.shp) files using 2013 data. For Gloucester, 1:10,000 scale was unavailable. The smallest scale available was 1:50,000 shape files dating

from 2016. The data for all three sites contained bedrock and superficial polygons, in addition to artificial ground polygons. Each individual data set was grouped together and combined as a separate layer.

- v) Contour data for all three case studies was downloaded from the EDINA Digimap website. The OS Terrain 5 data dated from July 2018 and was downloaded in shape files at a scale of 1:10,000. The data was inserted into ArcGIS and saved as a separate layer.
- vi) LIDAR data was not utilised in this study. This is because when the data was input into ArcMap 10.5.1, there was not full coverage; for example, the centre of Bristol did not have enough coverage. In addition, specific British National Grid data was unavailable.
- vii) Each position identified is a point. From each point, a series of cumulative viewsheds are conducted. A point is an element represented in space on the map by a co-ordinate; a cumulative viewshed forms the basis for analysis by suggesting that the location of the point is significant due to the resulting viewshed that the position holds in the landscape (Chapman 2006, 49). Points were created by obtaining 12-figure National Grid (NGR) (OSGB36®) co-ordinates, with eastings and northings uploaded from an Excel spreadsheet and saved as a comma-separated values (.csv) file.
- viii) The following settings and attributes form the restrictions on the data:
  - Offset A:** This is the maximum height of an observer's point (Rowe 2014, 298). For the purpose of this study, three heights for the cumulative viewshed were set:
    - a) 1.3m – the height of artillery. This information was taken from analysing the height of a saker at the Royal Armouries in Portsmouth. Most artillery was of this height (Nicholas Hall, 2016, pers. comm., 11<sup>th</sup> January, Keeper of the Artillery at the Royal Armouries in Portsmouth);
    - b) 1.5m – the height of a person for visibility purposes; and
    - c) 1.5m – the height of a person holding a musket.

**Offset B:** This is the height of the target point. A height of 1m was chosen to represent an offset height for each position (Rowe 2014, 300). Whilst calculations of the height of fortifications are possible, for example, at the surviving site of Fort Royal in Worcester and through contemporary accounts of fortifications, such as de Gomme's surveys of Bristol in 1643 and 1645, 1m was chosen because it represented a variety of factors. The landscapes of the three cities have been



developed over time in the 368 years since the conflict ended in 1651. Therefore, any viewshed calculation could be conducted from a higher landscape than that of the 1640s level. However, this does not account for the possibility that some of the fortifications were higher than the current landscape level, for example Prior's Hill Fort in Bristol. In addition, any surviving fortification would have suffered from erosion over time and cannot be confirmed to be the same height as during the conflict. It is noted that this is a significant but necessary variable, as it is not possible to generate data from the 1640s Civil War landscape.

**Azimuth 1 and Azimuth 2:** The default setting of  $0^\circ$  for Azimuth 1 denotes the anti-clockwise horizontal angle for the viewshed, with a default clockwise angle setting of  $360^\circ$  for Azimuth 2. Both these settings are default, as both artillery and muskets, and indeed visibility, can be rotated  $360^\circ$ , therefore providing a full firing arc for both these weapons (Rowe 2014, 300, 302).

**Vertical 1 and Vertical 2:** From a horizontal line, Vertical 1 is the upper vertical angle of the viewshed calculation. From a horizontal line ( $0^\circ$ ) (Rowe 2014, 300), for visibility, this is  $+90$ . This figure is given because people can see above themselves. For artillery, this equates to  $+10$ . This figure is given because the elevation of artillery is shown in Eldred (1646) in  $10^\circ$  increments (Nicholas Hall, 2015, pers. comm., 16<sup>th</sup> November). However, Hall, the Keeper of the Artillery at the Royal Armouries in Portsmouth (2015, pers. comm., 16<sup>th</sup> November), also comments that the range of artillery was generally within their point-blank range [no elevation]. Elevation, or depression, might be used for the lie of the land... although the principle of higher elevation giving longer range was well understood, and range tables were prepared, in action, it was very difficult to shoot accurately at longer ranges, although it was slightly more practicable in siege work". Despite this viewpoint, it is necessary to conduct viewsheds with this elevation because it was theoretically possible, if not always practical. For the musket, Vertical 1 is  $+45$ . This figure is calculated due to the practical capabilities of someone successfully firing and hitting a moving or stationary target. Vertical 2 is a lower vertical angle viewshed (Rowe 2014, 302). For visibility, the figure is  $-90$ , looking towards the ground. For artillery, this is 0, as to lower the barrel and raise the breech would have caused greater difficulty in firing the weapon accurately. For the musket, the figure is  $-45$ , as the weapon can be fired towards the ground.

**Radius 1 and Radius 2:** Radius 1 is the inner point from where viewsheds begin calculations (Rowe 2014, 302). For visibility, this is 0. For artillery, this is 1.53m. This calculation is based from the central point of an artillery piece firing its shot. The length of a demi-culverin is approximately 10 feet (3m) in length, and the robinet is 4 feet (1.2m). The figure is consistent because there would be too many variables between the lengths of each artillery piece, although it is acknowledged that some pieces have longer and shorter barrels than 1.53m. The figure for the musket is 1.2m. This figure is derived from the fact that the barrel of a matchlock musket was four feet (1.2m) in length.

The final attribute is Radius 2, which is the outer radius for viewshed analysis. For visibility, the calculation is 8,224m. This figure is based on how far a human being can see (Rowe 2014, 301, 302). There are five important forms of visual acuity, with the most important being recognition acuity, which is “the ability to recognize and identify a target stimulus” (Ogburn 2006, 406). In addition, important environmental factors, such as light, affect how far people can see, with the most important being sunlight, the position of the sun, weather and atmospheric conditions (Ogburn 2006, 406). The artillery figures are taken from **Table 2**. This means that there is a focus on the demi-culverin, saker, minion, falcon, falconet and robinet whilst understanding that cannons and mortars were used in sieges, for example at Bristol Castle in 1643. The decision was made to focus on the fortifications constructed in and around the city and the artillery pieces present at these locations. In addition, this meant that the elevation range of the artillery was consistent. The decision to use Robert Ward’s measurements, given in Atkin and Laughlin (1992, 86), is based on Ward (1639, 109). In addition, Henry (2005, 36) also cites Ward. The effective range of the weapon would be based on the size of the shot being fired from the artillery piece. Similar weights for the artillery shot are given in Eldred (1646, 15) and Nye (1670, 76–79). For the avoidance of doubt, the shot is taken to be a single round shot, as Ward (1639, 109) references “The weight of the *shot* in pounds” (author’s emphasis) and demonstrates a single round shot in the diagram when calculating elevation (Ward 1639, 133), with both Eldred (1646, 49) and Nye (1670, 49) focusing on a single round shot. By confirming this variable, the use of hailshot, particularly with the saker and demi-culverin on the battlefield (Foard and Morris 2012, 70), has been considered. The conservative range of the matchlock musket (probably the most common musket) (Hexham

1637, 20) is 50 yards (150 feet) (45m) (Wanklyn and Jones 2005, 28), as a soldier using that weapon is theoretically more likely to hit a target at that distance than at its maximum distance of 400 yards (365m). The ranges given for both the artillery shot and the musket balls are therefore chosen because they should be the most effective permutations.

- ix) An important factor is the georeferencing of plans and cartographic sources. It is not possible to confirm the 100% accuracy of all positions, as they are dependent on the grid references given by archaeological reports and the abilities of the GIS programme. For example, Rhodes (2014, 159) cites Plan D12862 as within “seven percent of those of the Ordnance Survey”, although it is unclear as to how this is determined.

### **2.2.7.3 GIS Issues**

The various factors that cause analysis problems when using GIS require explanation. The first is that the cartographic data downloaded from the Digimap website is modern data. This means that the data includes changes to the built and buried environments of landscapes and cities since the English Civil War, including successive buildings and roads, meaning that any points are naturally at a higher height than that of the Civil War landscape. The exceptions are surviving features in the landscape, for example the two bastions at Fort Royal, Worcester. However, the movement, displacement and weathering of earth at Fort Royal may mean that the fortifications' height is less than it was when it was initially finished, and therefore a fully precise viewshed report is not available.

Another problematic factor, in part connected with the first obstacle of modern cartographic data, is the changing paleoenvironmental data. Since the war ended 368 years ago, changes to the course of the River Avon in Bristol, for example, have occurred, which affect the background data that the viewshed analysis is performed on. This can also include changes in woodland, vegetation and the ecological environment (Chapman 2006, 114–116).

Regarding the artillery and musket ball shot, some factors are unable to be compensated for within the GIS programme. For example, air resistance was a fundamental problem that usually resulted in a reduction of speed, thus limiting the power of the bullet when it hits its target and even if it hits that target. Round shots, which were imposed by the muzzle loading of the 15<sup>th</sup> century, are unfortunate, as, from a ballistics perspective, the drag coefficient on a round object is very high. The large amount of force expelled when firing a gun is largely lost to overcome drag. Spherical objects emerging from a smooth barrel require a final point of

contact when they leave to generate spin. This spin was uncontrollable, as the speed of rotation and its axis could not be predetermined. Drag and deflection of air use energy, which is lost from the velocity of the projectile (Hall 1997, 135).

Finally, and regarding section vii) of Section 2.2.7.2 GIS Settings, the points of Bristol in 1643 are specifically illustrating the artillery available from Samuel Fawcett's list (see sections 5.4.3 The Artillery of Bristol in 1643 and 5.4.4 Analysis of the Artillery of Bristol in 1643). This means that the viewshed analysis shows more accurate viewsheds of the specific artillery and thereby what the besieged were working with at the time. For Bristol in 1645, at least in part, and of Gloucester in 1643 and Worcester in 1646 and 1651, the viewsheds of specific artillery are largely theoretical as no comparable lists survive in the historical record to make fully accurate comparisons.

## **2.3 Background to the Civil War**

War changes everything. The fundamentals of life, such as food supplies, can be examined in a new light. This includes the damage that conflict brings to fields and how quickly it can be repaired. The English Civil War, whilst not as dramatic on a social and economic scale as the Russian or French revolutions, did nevertheless alter the perception of the kingdom's agricultural potential and needs, with vast social implications (Thirsk 1992, 169).

In the 1630s, despite the situation being largely peaceful, with the occasional fenland or forest riot, livestock sickness and grain harvests were compounded by a series of wet seasons, causing great hardship to the people. Land enclosure made the situation worse, with a series of enquiries launched in 1632, 1635 and 1636, chaired by Archbishop Laud. Fines were levelled against people with enclosures, with some gentlemen continuing to pay dues well into 1639, some three years later (Lindley 1998, 6; Thirsk 1992, 170).

In 1635, the ship money tax was extended to all inland counties. Whilst politically difficult, it was a financial success, as Charles had debts of nearly £2 million in 1629–1630 but by the late 1630s had no debt and an annual income of nearly £900,000 (Gaunt 2014, 29). The legality was challenged and dismissed in 1640. If the tax prevailed then the Crown would have been able to remove the inhabitants of the newly acquired land and donate the land elsewhere. Where this occurred, the local people harboured significant resentment (Thirsk 1992, 170). In the Long Parliament, moderate Royalists recognised the problems of ship money (Lindley 1998, 7).

During this time, the Crown promoted a policy of improving common land. This meant that all land regarded as 'waste' – in excess of the needs of the manorial tenants – was required

for improvement. This law had become statutory during the Middle Ages, with some minor revisions during the early reign of Queen Elizabeth I, known as the 'Statute of Improvement'. Under the scheme, both James I and Charles I utilised fenland drainage schemes that allowed the Crown to claim profit from that land and reward the drainers. This process also involved some deforestation during the 1630s to improve industrial and agricultural development. This was not an entirely new idea, as the programme to reform the Crown's estate and management started during Elizabeth's reign, continuing, although haphazardly, during the reign of James I and into Charles's. One of the outcomes of this work was to examine the current land use and how the land might be farmed more intensively or differently in the future (Thirsk 1992, 170–171). As Thirsk (1992, 171) notes, these changes "did not make the monarchy popular".

Charles I's Personal Rule between 1629 and 1640 caused much conflict, albeit having positive financial results (Gaunt 2014, 29). In Scotland, Charles, along with Archbishop Laud, attempted to alter the religious fabric of the land by endeavouring to impose a new book of common prayer based on Church of England design. However, many in Scotland felt that Scotland, with its own church government, had inherited the Kingdom of England in 1603 under James I, not the other way around. This dispute ultimately led to the Bishops' or Scots' Wars in 1639 and 1640: the first conflict a stalemate, the second a Scottish victory (Russell 1997, 116; Gaunt 2003, 20). In 1639, England went to war without calling a Parliament for the first time since 1323 (Adamson 1997, 83).

In November 1640, the Long Parliament was created and over ten months attempted a series of reforms, which led to the end of Charles's Personal Rule and the death of the Earl of Strafford, along with the imprisonment of Archbishop Laud in the Tower of London. Strafford's death after Royal Assent in May 1641 by the passing of the Act of Attainder by 26 votes to 19 did not ease any tension (Fletcher 1981, 14; Gaunt 2014, 35–36).

Rumours abounded around Parliament: just before the attainder against Strafford, there were rumours of a French invasion, with peers twice voting since January for a fleet to be sent to the Channel to warn off any potential threat. Further French invasion rumours surfaced in May, with reports from Dover that Calais had 10,000 soldiers and 100 barrels of powder ready (Fletcher 1981, 26–27).

Rebellion in Ireland occurred in October 1641. It appears that how the Scots had taken up arms in the Scots' Wars when their religion was under threat had served as a template for Irish Catholics. The rebellion focused the attention of the king on Ireland, as many English, Welsh and Scots Protestants had been killed (Gaunt 2014, 37).

Partly because of the Irish rebellion, opponents of the king drew up a document known as the ‘Grand Remonstrance’, containing 34 clauses. The king’s monetary, religious and foreign policies were all attacked, and the remonstrance was the most acrimonious document of 1641. The committee that had composed the remonstrance did not trust the king (Fletcher 1981, 82–83, 145, 149–150; Gaunt 2014, 39).

The Grand Remonstrance passed through the House of Commons with a majority of 11 votes. In early 1642, the king passed a bill from Parliament excluding bishops from the House of Lords. This caused problems, as, by December, a group of bishops had claimed that they were unable to sit in the Lords and therefore any votes made in their absence should be rejected. Opponents of the king claimed that this was a breach of Parliamentary privilege and summoned the militia of London. On 3<sup>rd</sup> January, charges against five members of the House of Commons and one peer were created; on 4<sup>th</sup> January, the king entered the Commons with an army to arrest the ‘Five Members’, who had been told and were not present. Unsuccessful in arresting the Five Members, the king withdrew from London and by March had settled in York (Gaunt 2014, 40–41).

## **2.4 The English Civil War**

### **2.4.1 1642–1646**

The raising of the standard by King Charles I in Nottingham on 22<sup>nd</sup> August 1642 with a theatrical theme of the medieval is considered by many to be the starting point of the Civil War. The first major battle, each side having 13,000–14,000 men, occurred on 23<sup>rd</sup> October 1642, with neither side victorious (Gaunt, 2003, 34–35; Gaunt 2014, 46).

The war continued into 1643, with both sides holding equal amounts of territory; however, Parliament held the ports of Bristol, Exeter, Portsmouth, London, Boston, Hull and Milford Haven. Portsmouth, London and Hull also contained large arsenals of weapons. In the summer, the Royalists captured Devon, Dorset, Somerset, Wiltshire, parts of Hampshire and the majority of Gloucestershire, as well as Bristol (Gaunt 2003, 37–38).

On 20<sup>th</sup> September 1643, the First Battle of Newbury occurred, with 13,000–15,000 men on each side. The battle was inconclusive, and the Royalists retreated under nightfall, returning to Oxford. In the winter of 1643–1644, the Royalists held Wales and the majority of England – the king appeared to be winning the war (Gaunt 2003, 38, 40).

This changed by the spring of 1644. The Royalists were defeated at King’s Lynn in September, Winceby in Lincolnshire in October and in December, losing Chichester and Arundel in Sussex and Alton in Hampshire. The Battle of Marston Moor occurred on 2<sup>nd</sup> July

1644, involving 28,000 English and Scottish Parliamentarians and around 18,000 Royalists. A crushing victory occurred for Parliament. However, whilst successful in many ways, Parliament launched an unsuccessful assault on Newark, surrendering 7,000 men. In addition, a lack of co-operation between Waller and Essex, two commanders of Parliament in the south, gave advantage to the Royalists, with Colonel Essex having to withdraw from Lostwithiel. The Second Battle of Newbury occurred on 27<sup>th</sup> October 1644, ending in a draw (Gaunt 2003, 40–44).

In 1645, Parliament, under the command of Sir Thomas Fairfax, launched the New Model Army. Fairfax was able to conquer most of the west and south-west of England, taking Langport, Bovey Tracey, Torrington, Bridgwater, Bristol and Exeter. In addition, most of Wales fell to the Parliamentary cause. Parliament also won the Battle of Naseby on 14<sup>th</sup> June (Gaunt 2003, 45).

Attempting to relive Chester in the autumn of 1645, the king suffered a further defeat at the Battle of Rowton Moor on 24<sup>th</sup> September. By the summer of 1646, the king had run out of supplies and arms, so he surrendered (Gaunt 2003, 45; Morrill 1996, 373).

#### **2.4.2 1648**

Any settlement did not last, however, as the Parliamentary army marched on London twice in 1647 and again in December 1648. Earlier, in April 1648, Charles I had been branded a ‘Man of Blood’ in Old Testament language by refusing to accept the outcome of the first Civil War. He was subsequently tried and put to death. He was executed on 30<sup>th</sup> January 1649 in public outside Banqueting House in Whitehall (Lindley 1998, 30–31; Morrill 1996, 374).

#### **2.4.3 1651**

With the death of the king, the monarchy was abolished in England and Ireland, but not in Scotland. Scotland crowned Charles II as King of Britain (Morrill 1996, 375–376); however, the Civil War ended at the Battle of Worcester on 3<sup>rd</sup> September 1651. The Commonwealth continued under Lord Protector Oliver Cromwell until his death in 1658. King Charles II was invited to rule the Kingdoms of England, Scotland and Ireland, and the monarchy was restored in 1660.

#### **2.4.4 Impact**

According to Carlton (1991, 18), some 635 incidents occurred during the Civil War, which resulted in the following:

|            | Killed | Prisoner |
|------------|--------|----------|
| Parliament | 34,141 | 34,493   |
| Royalist   | 60,597 | 83,041   |
| Total      | 84,738 | 117,534  |

Thomas Hobbes believed that 100,000 Englishmen had died as a result of the conflict, with Sir William Petty stating that 300,000 had been killed. During the nine major conflicts, only 17% of Roundheads and 12% of Cavaliers died, with over 1,000 casualties. Nearly half (47%) from either side died in conflicts where fewer than 200 died (Carlton 1991, 17, 18). Purkiss (2006, 3) suggests that 800,000 people died as a result of the conflict in the British Isles, with many deaths occurring in Ireland (one in four men serving on either side). Analysing the total casualties, Carlton (1991, 20) gives the following data:

|                                |         |
|--------------------------------|---------|
| Direct deaths from combat      | 84,738  |
| Indirect deaths (i.e. disease) | 100,000 |
| Accidents                      | 300     |
| Bishops' War                   | 500     |
| Total                          | 185,538 |

Reducing the total figure to 180,000, with the population of England at approximately five million, this means that 3.6% of the population was killed as a result of the conflict. During the First World War, 2.6% of the population of the United Kingdom was killed; for the Second World War, the figure falls to 0.6% (Carlton 1991, 20).

*“A whole file of men, six deep, with their heads struck off with one cannon shot of ours”.*

Captain Gwynn, recalling the events of the First Battle of Newbury  
(Carlton 1991, 25)

*“somewhat dreadful when bowels and brains flew in our faces”.*

Sergeant Henry Foster, describing what he witnessed at the First Battle of Newbury  
(Carlton 1991, 25)



The above two quotations from Parliamentary officers demonstrate the horrors and impacts of the cannon on the battlefield, not only to the soldiers killed by the weapon but also in the images left in the minds of the soldiers who survived.

*“You may read it in the ruins of this place...her heaps of rubbish, her consumed houses, a multitude of which are raked in their own ashes. Here a poor forsaken chimney, and there a little fragment of a wall that have escaped to tell what barbarous and monstrous wretches there have been”.*

Minister of Taunton George Newton, 1646  
(Wroughton 1999, 195)

Following the unsuccessful 94-day Siege of Taunton in 1645, the above quotation from George Newton, one year later, highlights the effects of warfare on the town, where two-thirds of the houses were destroyed, 150 soldiers were killed and 200 were severely wounded (Wroughton 1999, 227–228).

*“the massacring, dismembering, cutting of dying or dead bodies...arms, legs, yea the brains themselves lying distant from their heads, bodies and other parts”.*

An account of the sacking of Bolton in 1643 on the townsfolk by the Royalists  
(Purkiss 2006, 295)

The above account of the Royalists’ sacking of Bolton reveals a disturbing atrocity committed on the Lancashire town, although such atrocities were relatively rare, as Carlton (1991, 19) notes that “both sides spoke the language, and did not regard the other as inhuman malignants”.

## **2.5 The Civil War in the West**

After the indecisive Battle of Edgehill, the king’s army withdrew to Oxford, whilst the Parliamentarian Earl of Essex reorganised his troops in the Severn Valley area by withdrawing the garrison from Worcester to Bristol. From Hereford, the Earl of Stamford became commander of Parliament in the south-west and moved his forces to Gloucester. In January, he moved to Exeter, with Colonel Essex taking command of Bristol. Because of this movement, the Royalists regained control of Herefordshire and Worcestershire, creating garrisons in the

county towns. The Cotswolds remained in Parliamentary hands, who began to secure Cirencester (Wanklyn and Jones 2005, 62–63).

In the autumn of 1642, Parliament, under the Earl of Stamford, secured Bristol. On 11<sup>th</sup> February 1643, Sir William Waller was promoted to Major General of Shropshire, Worcestershire, Gloucestershire, Wiltshire and Somerset; however, this was because Parliament had lost control of Cirencester to Prince Rupert. Strategically, the Royalists now controlled the area between Oxford and their areas in the north and west. The loss of Cirencester to the Parliamentarians meant that Bristol and Gloucester were under direct threat from the garrisons established there and in Malmesbury; in addition, the communication between Bristol, Gloucester and London was put under intimidation (Wanklyn and Jones 2005, 69, 71–72).

Proceeding towards Bristol, Waller moved throughout the night via Winchester, Romsey, Salisbury, Sherborne, Wells and Bath. Once in Bristol, he surveyed the situation in Gloucester and the Severn Valley. During this time, Colonel Nathaniel Fiennes arrived in Bristol and took over command of the city from Colonel Thomas Essex. During the winter, the focus of both sides leaned to the south and west; however, Wales was important to the Royalist cause, with Lord Capel becoming Lieutenant General of Cheshire, Shropshire and North Wales and moving into Shrewsbury to secure it and the principal towns. In the north, the Earl of Newcastle had control of Cumberland, Westmorland, Northumberland and Durham. The earl moved into Yorkshire and held the city of York after a brief engagement near the River Tees on 1<sup>st</sup> December 1643 (Wanklyn and Jones 2005, 73–75).

The Marquis of Hertford, along with 2,000 troops, most of them infantry, entered the Cotswolds, crossing the River Severn to join Prince Rupert. The focus continued on the Thames Valley region, although the garrison of the Earl of Stamford remained in Gloucester. Of the two Worcester regiments, one remained in Bristol until its capture in July 1643, with the other marching farther into the south-west (Wanklyn and Jones 2005, 77–78). Worcester was of strategic importance because of its closeness to Oxford. However, this was a burden to the city because after the Royalists' unsuccessful attempt to capture Gloucester, the king issued a demand in September 1643 that the city pays £4,000 and the county pay £3,000 to pay for his army (Styles 1997, 200).

After the capture of Bristol, Waller was most concerned with holding on to the city along with Gloucester, as well as stopping Lord Herbert and his reinforcements from reaching Oxford from South Wales. Lord Herbert's brigade of infantry had, however, made inroads into the Forest of Dean and was holding position in Highnam, only two miles from Gloucester. The

brigade was ineffective but did make attempts to stop Colonel Edward Massey, Governor of Gloucester, from obtaining supplies for the city from the west of the River Severn. At Cirencester, to the east of the River Severn, a small group of dragoons and infantry had also attempted to stop Parliamentary supply routes. After arriving in Bristol on 15<sup>th</sup> March 1643, Waller attacked Malmesbury on 22<sup>nd</sup> March, which surrendered; he then looked to attack Cirencester. Deciding against this, he crossed the River Severn at Framilode, seven miles to the south of Gloucester, and, with the garrison from the city, surrounded Highnam. The 1,500 Royalist foot soldiers in Highnam surrendered. Prince Rupert decided against engaging Waller in battle, although from Cirencester he recaptured Malmesbury before returning to Oxford (Atkin and Laughlin 1992, 173; Wanklyn and Jones 2005, 84–85).

Control of the lower Severn Valley was important to both sides. Prince Maurice had joined Grandison at Cirencester, and for two weeks Maurice and Waller played cat and mouse with each other around the Forest of Dean and the Vale of Tewkesbury. Maurice nearly trapped Waller's army between the forest and the River Severn; on another occasion, he damaged the rear-guard of Waller's army in Ripple near Tewkesbury. Waller managed to destroy some of the Royalist infantry in Tewkesbury. In late May, after travelling to Bath, Waller looked to take Worcester. Whilst it was possible that the Parliamentarians could capture the city, they would have been unable to hold it without compromising the garrison in Tewkesbury. After failing in Worcester, Waller returned to Somerset; however, the Royalists had taken Chard on 4<sup>th</sup> June (Wanklyn and Jones 2005, 86, 90).

The success of the Royalist army against Waller's army at the Battle of Roundway Down was one of Waller's many strategic errors, which also included an ineffective campaign in Somerset and Wiltshire (despite success at the Battle of Lansdown), as well as removing large parts of the Bristol garrison to his field army and having Gloucester occupied by wounded soldiers (Wanklyn and Jones 2005, 103–104). After the Battle of Roundway Down on 13<sup>th</sup> July 1643 and the destruction of the Parliamentary army of Sir William Waller, both Gloucester and Bristol were targets for the Royalist cause (McGrath 1997, 103).

In 1645, Bristol was again affected by the military situation outside its walls. With the king defeated in Naseby on 14<sup>th</sup> June, Goring defeated in Langport on 10<sup>th</sup> July, Bridgwater attacked on 21<sup>st</sup>–22<sup>nd</sup> July, Bath surrendered on 29<sup>th</sup> July and Sherborne Castle captured on 14<sup>th</sup> August, the attention of Fairfax and Cromwell turned to Bristol. They decided to attack, rather than have Bristol reinforced with Royalist troops from Wales, as well as Clubmen from Dorset, Wiltshire and Somerset (McGrath 1997, 112–113).

### **2.5.1 Bristol**

Bristol was one of the most important cities in the country, having a population of around 15,000. As Lynch (1999, 5) confirms, it was a “communication, administrative and manufacturing centre”. The port was of importance to the Royalist cause, allowing them to import arms. The successful capture of Bristol in 1643 allowed them to continue the war. Although shipbuilding was not a significant industry, glass making; soap, rope and sugar production; and, most importantly for a war, gunpowder milling was. Having supplies of charcoal, iron, coal, lead and copper from the Forest of Dean, Kingswood and the Mendips meant a metallurgic industry had developed, allowing for the creation of muskets. The creation and expansion of these industries explained how the city developed beyond the medieval walls (Lynch 1999, 4, 5, 9).

### **2.5.2 Gloucester**

Whilst trade was dominated by the city of Bristol, Gloucester was an important centre for textiles, food and drink, as well as grain, metalworking and tanning. Whilst much of the economy was still dependant on the surrounding agricultural land (Atkin and Laughlin 1992, 9–10), having a city that could potentially clothe, feed and create metal objects for either army during the Civil War made Gloucester an important strategic hold during the conflict and demonstrates its importance.

### **2.5.3 Worcester**

Worcester was, like the county, a strategic Royalist stronghold, as it provided weekly sums of money and customs from its port. The River Severn was used to transport supplies, along with the road network, with supplies from Bouldon and Leighton and ordnance from Bridgnorth meeting in the city before being transported to the Royalists’ headquarters in Oxford. Along with Bristol and Oxford, Worcester formed an essential triangle of munitions and arms for two years from the summer of 1643 for the king’s cause. In addition to its role as a transport hub, it was also an essential manufacturing centre, particularly of iron. This is illustrated by a receipt of 25<sup>th</sup> December 1643, when Worcester received two tons of iron for special use to be sent to Oxford (Roy 1964, 25, 35–37, 46, 122).

## 2.6 Position in the Discipline

The archaeology of the English Civil War bridges many disciplines. It covers four main themes of archaeology: post-medieval archaeology (c. 1485–present), post-medieval landscapes, battlefield archaeology and conflict archaeology. Each field is examined as follows:

### 1. Post-medieval archaeology (c. 1485–present)

As a series of events that occurred after the accession of Henry VII to the throne of England in 1485, and the uniting of two crowns under James I of Great Britain in 1603, the position of the English Civil War is secured in this branch of historical archaeology. However, whilst the Civil War stands as an event in history, a cursory examination of the literature involving archaeology of this period shows that it receives little attention (see 1.3.2).

### 2. Post-medieval landscapes

As with post-medieval archaeology, the reason for the Civil War's position in the literature on post-medieval landscapes is obvious. The Civil War, whether through battles, the construction of fortifications or sieges, had a significant effect on the landscape. Estimates suggest that there were over 600 sieges and battles, 10,000 buildings damaged beyond repair and 150–200 country houses destroyed, the net result of which meant that one in ten lost their home. The overall effect on the landscape included destroying the suburbs of towns and cities, arable and pastoral farmland, hedges, and castles; blocking streets; and digging mass graves (Morrill 1996, 367; Harrington 2004, 4; Barratt 2009, 1).

### 3. Battlefield archaeology

The Civil War naturally fits into battlefield archaeology, as numerous battles, such as those at Marston Moor and Naseby, occurred during the conflict. Lynch and Cooksey (2007, 12) define battlefield archaeology as a study of evidence involving military activity. For them, this definition encompasses “the ‘archaeology of conflict’ at both the macro and micro level” (Lynch and Cooksey 2007, 12). Carman (2013, 41–42) separates battlefield archaeology into two sections:

- 1) The study of the remains of a formal battle between opposing armies. This excludes sieges, uprisings, revolts and skirmishes; and
- 2) Encompassing all aspects of conflict from ancient times to the modern day, examining any period, including military bases, logistics, encampments and reburial of the dead. This

field is termed ‘conflict archaeology’, whilst battlefield archaeology focuses on specific events.

Therefore, a siege that involves a town or city but does not fire a shot or storm the target (in this case, the very act of creating lines of contravallation, limiting relief efforts and supplies) can be considered under conflict archaeology but not battlefield archaeology. However, at what point does battlefield archaeology switch to conflict archaeology? The sieges of Bristol, Gloucester and Worcester can all be classified as battlefields because battles between opposing armies occurred in the landscape; however, it is suggested that these scenes would be considered under conflict archaeology. This is because an analysis of the sieges involves an understanding and appreciation of sites, army logistics, the preparation of fortifications and the positioning of artillery – essentially, all aspects of conflict during the middle of the 17<sup>th</sup> century.

#### 4. Conflict archaeology

Archaeology of the English Civil War is part of the overreaching umbrella of conflict archaeology. As discussed above, it involves all aspects before and after a conflict (Carman 2013, 41–42). Indeed, further sub-division occurs, as this thesis involves landscape analysis of the fortifications constructed during the conflict. Therefore, it is also placed into a study of fortifications, sometimes termed ‘military architecture’.

Interestingly, Pollard and Banks (2005, iii) note that “Britain’s own Civil War, which took place over 360 years ago...has suffered, at least as far as archaeological study is concerned, from its dislocation from the modern world; in short, it is not regarded with the same reverence or immediacy”.

## 2.7 Summary

This methodology chapter has demonstrated the importance of landscape archaeological techniques in order to answer the questions surrounding the fortifications constructed during the English Civil War.

By utilising the geological, topographic, cartographic, ‘grey literature’, published sources, along with the GIS programme for viewshed analysis, the thesis will attempt to answer the research questions posed in section 1.2.

## **Chapter Three: Urban Archaeology – The Development of Town Defences**

### **3.1 Introduction**

The purpose of this chapter is to examine the development of town defences. The chapter begins with a discussion of the state of the defences of the medieval towns before moving on to the introduction of the *Trace Italienne* style of fortifications in the British Isles, in conjunction with events on the continent. There is then a brief overview of the sieges and the defences constructed during the Civil War. Finally, the chapter concludes with why it was important for both sides to hold the three case study cities of Bristol, Gloucester and Worcester.

### **3.2 Medieval Towns**

As noted by Creighton and Higham (2005, 221), the end of the 15<sup>th</sup> century is erroneously considered to mark the beginning of the end of investment in medieval town defences, with the Tudor era cementing the decline. Whilst this was true for some towns as urban life expanded beyond its medieval limits, investment continued in military sites, such as the construction of coastal artillery fortifications

Investment in town walls and gates, particularly in locations adjacent to the sea, such as King's Lynn, Harwich, Exeter and Yarmouth, continued into the Tudor and early Stuart eras. In Berwick-upon-Tweed, Carlisle, Hull, Portsmouth and Plymouth, the medieval defences were enhanced and, in some cases transformed, with the main focus on the naval facilities at these sites. Carlisle, Harwich and Hull benefitted from the scientific method and mapmaking that began in the Tudor period, with plans depicting fortifications in new detail (Creighton and Higham 2005, 221–225). The effect of the Dissolution of the Monasteries during the reign of Henry VIII affected Exeter, with the ancient enceinte restored using stone from St Nicholas's Priory, and St John's Church being converted into an artillery store (Creighton and Higham 2005, 222). After Henry's death, investment continued along the coast, with enhancements constructed on the Isles of Wight and Scilly, in addition to the Channel Islands (Saunders 1989, 55).

Whilst coastal towns received investment, inland towns did not fare so well. However, this was due to the political landscape in England (later Great Britain), which was one of peace. Stuart Britain had experienced a generation of peace, and the island had not seen a great struggle since the Wars of the Roses (Parker 1996, 51; Harrington 2003, 10). This meant that there was no reason to update the many towns and cities with modern continental defences. Peace and prosperity had meant that many towns had expanded beyond their medieval walls.

Where towns had not expanded, they were “enclosed (rather than defended) by outdated medieval walls wholly susceptible to artillery bombardment” (Parker 1996, 28). Earlier Elizabethan and Jacobean campaigns in Ireland, whilst like the wars on the continent, did not involve long sieges or the requirement to construct *Trace Italienne* earthworks. Where sieges did occur in England, for example during 1549 in Norwich and Exeter, these were a result of rebellions. The destruction of property was also not seen as something associated with military activity. This was because of the lack of military campaigns in England and the threat as not seemingly an internal one but external; power rested with the navy in Tudor times, as a result of the Spanish Armada victory of 1588 (Harrington 2003, 11; Porter 2011, 4, 12).

It is therefore not surprising that the agrarian society of the 1640s, containing market towns and villages but also larger towns (such as Bristol, London and Hull, in addition to York, Chester and Winchester, which were of Roman origin), was not ready to create defences to modern mid-17<sup>th</sup> century continental standards in order to counteract artillery, albeit the aforementioned coastal towns had some modern defences (Harrington 2003, 10–11).

It is because of the English Civil War that the medieval towns and associated defences received a new and renewed role. The construction of new enceintes and the refortification of medieval castles, outworks and siegeworks greatly affected the townscapes. Existing medieval town walls, such as those in Exeter and Oxford, resulted in the re-use of the medieval wall and ditch combined with extensions, including angled bastions, entrenchments and satellite positions monitoring approaches. It is interesting to note that during this period, the use of earth and timber for defence, rather than complete masonry structures, represented a return to technology seen in pre-history. In some cases, however, the Civil War represented a rebirth and reinvestment in medieval towns and their defensive walls (Creighton and Higham 2005, 227–230).

### **3.3 Arrival of *Trace Italienne* Fortifications in Britain**

The primary reason for a change in fortifications was the gun. Medieval walls were built of a thickness and height so that marksmen could be protected by crenellations whilst attempting to stop the enemy advance. Walls were designed so that even if they were being scaled, the advancing army could be shot at via the flanks, thanks to the taller towers constructed at various intervals. Walls were also constructed so that defenders could attack the besiegers vertically. Siege engines did influence medieval walls; however, because they were cumbersome and inaccurate weapons, they were unable to repeatedly attack the same point. It appears that the weapons’ main role was to hurl provocative material at the inhabitants – a role that was taken



over by the mortar. The ability to ram or use mines was not a key element in constructing high walls; this was determined by the priority of having a tactical height advantage over the attackers. The long-range, horizontal weapon of the 15<sup>th</sup> century, the gun, changed the situation irrevocably. Whilst it was not the most accurate weapon, it brought an almost seismic shift in offensive/defensive fortifications (Hale 1965, 474).

To counteract this new technology, two methods were chosen. The first was to increase the thicknesses of walls; the second involved the walls being scarped – sometimes for two-thirds of the height of the wall. The reason behind this was to try to minimise the impact of the cannon ball. The preferred method was scarping, as it weakened the siege ladders used to scale the defences by increasing the angle of the wall. However, scarping is rarely seen in fortifications built at the start of 15<sup>th</sup> century, as it was an initial reaction to this new weapon (Hale 1965, 474–475).

This resulted in a significant shift from lowering walls to the concept of flanking. Flanking fire from a significant high position (e.g. a tower) had long been recognised as an essential ingredient of defence; however, it now assumed a new place in warfare. Initially, gun towers were modelled on the older pentagonal all-round towers but contained letterbox-shaped/keyhole loops for cannons and handguns in the place of the traditional arrow slits. From the defendants' viewpoint, the cannon was seen at the outset as a weapon to be used only in close-range vicinity, rather than as a long-range deterrent. This paradigm gradually shifted when people realised that it could be used to break up the attacks of the besiegers and their artillery. A decision was then made to place guns on the platforms on top of the towers – the bastion was born. The tower was a defensive work; the bastion was the new aggressive offensive weapon (Hale 1965, 475).

In addition to stone and masonry, earthen bastions were utilised in Ravenna (1512) and Verona, with the engineer Lanteri being one of the first to regularly construct fortifications made of earth (Hughes 1974, 77, 105). The Dutch school of engineering became important during the English Civil War because of the similar topography and the use of earth as the main construction element. This had the additional benefit of helping to reduce construction costs. This is because the strategy of both sides was to hold towns and cities to control populations and resources (Saunders 1989, 72–73).

During the reign of Henry VIII, a series of squat fortifications were constructed along the coast of southern England. Utilising round rather than angled bastions and thereby resisting the introduction of the *Trace Italienne* fortifications, the structures appear to have been, architecturally and technologically, obsolete at the time of their construction. However,

considering that the task of the fortifications was to provide a platform to mount enough numbers of artillery to prevent an enemy force from landing along the coast, either bastion could accomplish this endeavour. Despite being away from the main theatres of conflict during the Civil War, Henrician fortifications performed admirably, with only Southsea Castle near Portsmouth being taken by direct assault on 4<sup>th</sup> September 1642, although when the Parliamentarians entered, they only found 12 men inside and a drunken governor. Pendennis Castle in Cornwall, which had the addition of an Elizabethan bastion and earthen ramparts, was subject to a five-month siege by the Parliamentarians (Coad 1997, 162; Hutton and Reeves 1998, 226; Fissel 2001, 191).

### **3.4 The Thirty Years' War**

The Thirty Years' War (1618–1648) was the most relevant and ongoing conflict of a series of long, drawn-out wars during the same period as the English Civil War. Numerous conflicts plagued Europe from the end of the 15<sup>th</sup> century, including the Italian Wars between 1494 and 1559, the French Religious Wars in 1562–1598 and 1621–1629, the Eighty Years' War in the Netherlands in 1572–1607 and 1621–1647, and a further war in Hungary in 1593–1606 (Parker 1996, 43). During only three years of the 17<sup>th</sup> century was there peace (Carlton 1992, 8).

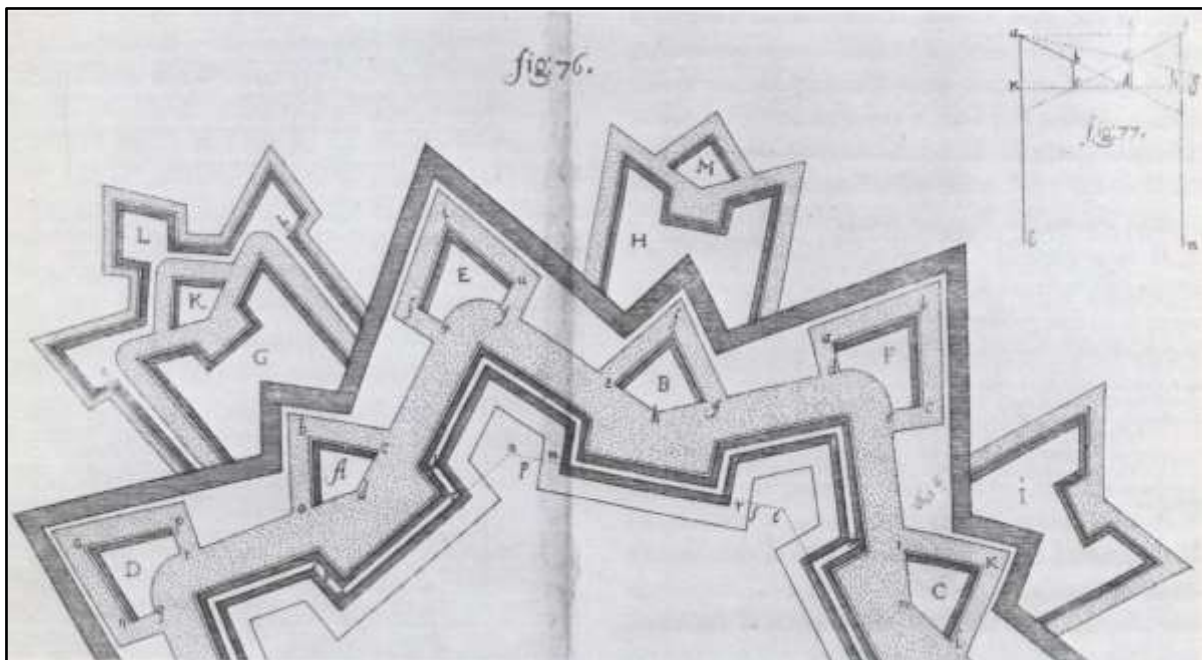
Maurice of Nassau controlled territory by having a series of fortified cities, making battles largely irrelevant because the towns would have to be besieged. This meant that his standing army could be relatively small – a maximum of 10,000 men. In 1632, the Dutch laid siege to the fortress of Maastricht, controlling all communication between Westphalia and Brussels (Parker 1997, 116, 185). The influence of the Dutch extended to English siege techniques, with both Prince Maurice and Prince Rupert, along with Fairfax and Goring, having served under Frederick Henry of Nassau at the Siege of Breda in 1637 (Duffy 1979, 145), albeit with Prince Rupert favouring the approaches of Gustavus Adolphus (Day 2007, 65).

Gustavus Adolphus, the Swedish king, operated a different approach to the Dutch, which depended on controlling large areas by being successful in battle, an example being his utilisation of total exclusion zones and creeping barrage techniques when conducting the Siege of Riga in 1621 (Parker 1997, 62, 185). For the English Civil War, this meant that the control of towns was essential and that the crippling blow was dealt in battle, but the battle only occurred because of the control of the town and its resources.

The essential ingredients of the Dutch fortification were the construction of earthen ramparts accompanied with a wet ditch. The flanks of the bastions were usually at right angles, with the bastions a maximum of 250 yards (228.6m) apart because of the range of musketry.

The fortifications of Ghent constructed in the 1570s demonstrated the importance of constructing with earth, as, despite the earth fortifications taking two years to construct, the equivalent masonry fortifications would have taken 20 years (Duffy 1979, 90–91).

Key characteristics of the Dutch style of fortifications are demonstrated in **Figure 4** dating from Freitag in 1631. Duffy (1979, 90) states that the illustration shows an “Enceinte with fausse-braye, broad wet ditch, continuous outer enceinte (envelope), and elaborate detached works – ravelins (A, B, C), demi-lunes (D, E, C) and hornworks (G, H, I)”. Duffy notes that the English attempted to construct in four years what the Dutch had taken decades over. The majority of towns had fortifications of a “...English fashion : namely, with trenches lines which were reinforced every few hundred yards with square redoubts or bastioned forts” (Duffy 1979, 157).



**Figure 4: The Dutch style of fortification (Duffy 1979, 90)**

### 3.5 Brief Overview of the Sieges and the Defences Constructed During the Civil War

Due to the very nature of the Civil War, neither side was able to be completely secure with the territory they held. This meant that significant resources were expended attempting to keep the peace and prevent revolt in towns and cities. In England and Ireland, by the end of 1643, there were very few areas that were not subject to attack by either side, with the Royalists suffering more because Parliament had control of the navy. Parliament held Hull, Portsmouth, the Tower of London and the Weald. The first three were locations where heavy guns were deposited, with the latter containing a cannon foundry. In addition, the territory it held along the east and south coasts of England also contained the most redeveloped and enhanced fortifications. The

significance of having control of the navy meant that Hull (1642), Plymouth (1643), Pembroke (1644) and Lyme (1644) were all maintained by Parliament. A final important element was that each field army rarely commanded an entire region, with isolated Royalist or Parliamentary towns surviving. By 1645, Parliament was consciously destroying/slighting castles and houses to prevent Royalist strongholds from remaining (Hutton and Reeves 1998, 199, 201).

The effects of sieges could be devastating. In Colchester, the population and garrison had eaten most of the horses and were also eating dogs, with similar results in Carlisle, including consuming rats. At Scarborough Castle in 1645, the Parliamentarians bombarded the feature, which had been reinforced with earthwork defences by the Royalists. After an ineffective assault, the Parliamentarians blockaded the castle; after seven months, the inhabitants surrendered due to suffering from scurvy, with around ten people dying per night. Another Parliamentary siege in Pontefract in Yorkshire gave the Royalists enough time to add 15 feet (4.57m) of earth to the defences. Despite launching around 1,400 shots and using whole cannons and demi-cannons, the Parliamentarians were unsuccessful in penetrating the castle. Like Scarborough, they blockaded the castle and it fell when the Royalists ran out of supplies seven months later (Hutton and Reeves 1998, 215, 225).

### **3.6 Why Hold Bristol, Gloucester and Worcester?**

The evidence examined has demonstrated that all three towns would have been extremely important for both sides because of the resources and communication routes they held. The fact that Bristol was the second city of England demonstrates alone that if either side wanted a successful campaign, they needed the city because of its manufacturing operations, port and strategic setting in providing communication routes to other major centres. The same was true for Gloucester, as it was a hub of resources from the Forest of Dean, as well as holding a vital strategic position towards London and the Royalist capital of Oxford. Finally, adjoining the River Severn, Worcester was a major trading route and had roads to all other major towns.

It was for these reasons that Parliament decided to construct a series of defences around Bristol in 1642 and why the Royalists besieged the city in 1643; it also explains why the Royalists spent the next two years attempting to upgrade its defences, only for it to be taken from them in 1645.

The same situation applies to Gloucester. For the Royalists, not having control of the town meant that their trading route in the Severn Valley was blocked, which was why they

conducted a siege in 1643. For Parliament, it was an important strategic position: a gateway into the south-west of England and an important position to monitor activity in Royalist Wales.

The importance of Worcester was seen in Sir William Waller's failed attempt to capture the city in 1643 for Parliament. Without having control of the city and the resources it held, Parliament also lost a vital strategic element and successful utilisation of the Severn Valley trade route, hence a further attempt in 1646.

From the summer of 1642 and into the autumn, both sides began to gain and were successful in gaining support and territory for their respective positions. This also included raiding territory for arms, horses and money, amongst other things. The holding of Bristol, Gloucester and Worcester for either side during the conflict with garrisons meant that what they held was significant in the overall aim of winning the war. Naturally, this meant that the towns' defences would have undergone renovation, a programme of modernisation and the construction of completely new defensive positions. This also meant the destruction of areas, particularly outside the medieval walls, to hold and secure what was constructed inside. Bristol, like Plymouth and Chester, did not require such destruction of the suburbs, albeit Bristolians did complain about the destruction of gardens, orchards and pasture enclosures. However, the opposite was seen in Gloucester, Exeter and Bridgwater (Porter 2011, 15, 17–19). The resources, men and equipment each town held were essential ingredients in the war, and whoever held them would have had a more successful campaign.

### **3.7 Summary**

The evidence examined has illustrated that the end of the medieval period did not see a fundamental decline in the investment in towns. Although investment largely focused on the naval towns, the Tudors and Stuarts understood Britain's unique position as an island in Europe and the wider world.

This, in part, explains why the *Trace Italienne* and the angled bastion took so long to arrive in Britain. Whilst developments continued on the continent due to numerous wars, future Royalists and Parliamentarians were influenced by what they experienced.

The advantages of controlling towns, cities and the surrounding landscapes explain why it was necessary for both sides to fight, hold and attempt to gain control of Bristol, Gloucester and Worcester, with the following chapter examining the fortifications in more detail.

## Chapter Four: Fortifications of the English Civil War

### 4.1 Introduction

The focus of this chapter is to examine what fortifications were constructed during the English Civil War. It focuses on construction and design, with emphasis on bastions, flanks, ramparts and ditches. There is also an examination of the weapons of the period, particularly artillery, as fortifications and artillery pieces co-evolved.

### 4.2 Fortifications of the English Civil War

The main purpose of a fort is that a few men can defend themselves from a greater number. The defended position must consist of a rampart or wall with a ditch that is of enough height, breadth and depth to stop the assaults of the enemy (Norwood 1639, 5).

Whilst the medieval castles “have been much decayed in their several Magazens of Armes” (Anon. 1642, 4), the Henrician forts appeared, due to their geographical location, to be maintained to a suitable standard, despite, arguably, being obsolete before construction was complete. These and sites such as Berwick-upon-Tweed were the most modern by 17<sup>th</sup>-century standards in England, as it was noted that “of late yeares have wanted much provision of abiliaments for Warre, or warlike defence” (Anon. 1642, 4).

As noted, some of the most-modern fortifications were at Berwick-upon-Tweed, although these fortifications were Elizabethan and of Italian influence (Osborne 2004, 13–14). Additional works, including an earthwork parapet, were added during the time of the Civil War to the fortifications at Berwick-upon-Tweed, and the fortifications repulsed an assault by the Earl of Newcastle in 1643. The site was occupied by the Scots until 1645 (MacIvor 1972, 19).

This lack of modernised fortifications meant that at the beginning of the English Civil War, many towns and cities had dilapidated defences from the medieval era and, in some cases, from Roman times. **Figure 5** illustrates why the angled bastion developed and overtook the rounded bastion. As it demonstrates, the rounded bastion left dead ground, meaning that as soon as men and/or weapons reached this position, the artillery pieces were seriously compromised, giving a key tactical advantage to the besieging troops.

Pre-decimal, traditional methods of measurement were used during the period, including rods, feet and paces. To put these measurements into a modern context, it is important to examine the texts of the period. Norwood (1639, 5) explains that two paces equals one rod and “a Rod of tenne foote... five such rods or 50. Feete”. Therefore, one rod is 10 feet, which is 3m. Further measurements, according to Norwood (1639, 4), are “a toile containing sixe

feete, other verges or rods of 12. feete to a verge” with “centesmes or hundredth parts of rods” (Norwood 1639, 40).

There are three key elements to a fortification: the curtain wall (rampart), the flank and the bastion. The Thirty Years’ War produced a variety of new systems of defence; two of the most important were the Dutch and French systems. The French system required a polygon of fewer than nine sides, accompanied with a right angle ( $90^\circ$ ) between the flank and the face of the bastion. This system produces an acute angle (less than  $90^\circ$ ) between the curtain wall and the flank. This system was not designed to defend the face of a bastion from the flank of the next; for this, other works, such as ravelins and tenailles, were to be constructed in the fort’s ditch (O’Neil 1960, 83).

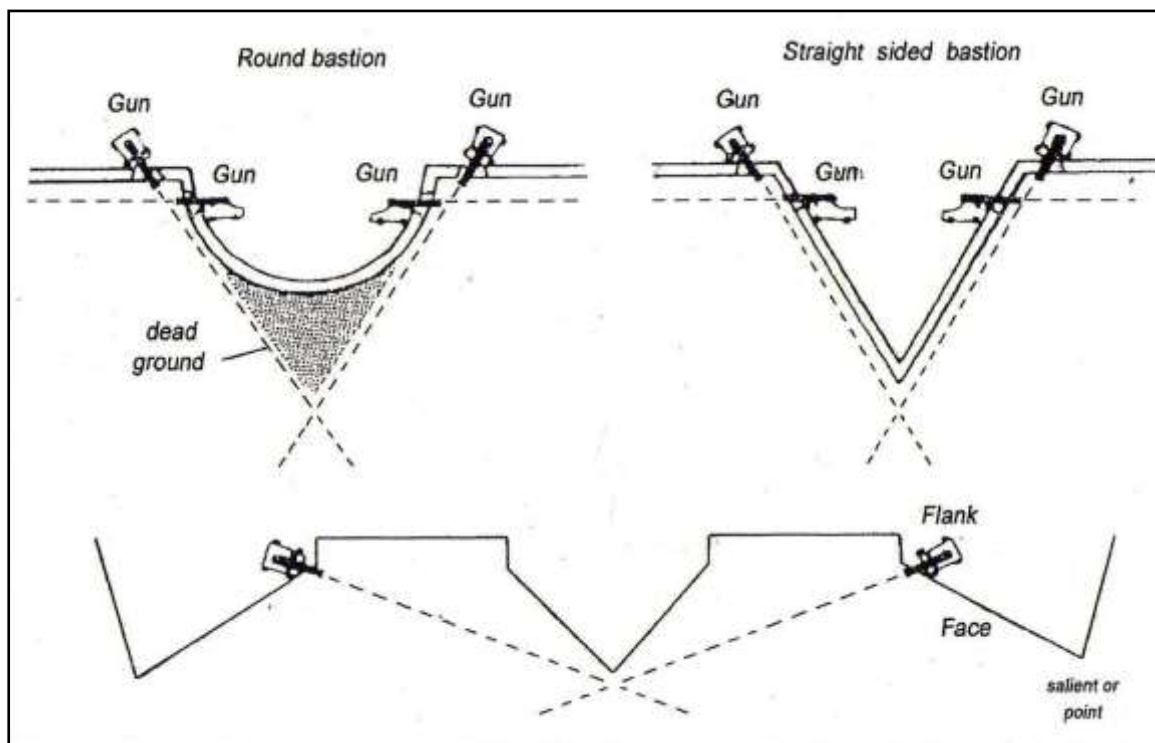


Figure 5: Round and straight-sided bastions (Lynch and Cooksey 2007, 117)

The Dutch system requires the flanks of a bastion to be perpendicular to the curtain wall, with the salient angle of the bastion itself being no more than  $90^\circ$  and in a square could be as little as  $60^\circ$ . From the base of the flank to the salient angle of the next flank, the distance should be no more than 240 yards (219.45m) if defended by muskets alone. The length of the curtain wall was later fixed to 144 yards in length (131.67m) (O’Neil 1960, 84; Osborne 2004, 14).

Ward's (1639) fortifications manual examined the works of Dutch engineers. It can therefore be clearly argued that he favoured the Dutch technique of constructing fortifications. In the 1570s, the Dutch, rather than building stone-constructed fortifications, used earthen banks, palisades and ditches flooded with water (Courtney 2006, 168).

Fortifications took many shapes and sizes, anywhere from three to 12 sides; Ward (1639, 38–39) explained that a pentagon was the “best” shape for an irregular fortification due to its size, closely followed by the sconce (**Figure 6**). The pentagon shape forms the basis for the design of the Royal Fort, Bristol, whilst Porter (2011, 17) suggests that the “Great Sconce” is Fort Royal of Worcester. According to Norwood (1639, 123), one man can dig 500 cubic feet (14.1 cubic metres) per day.

There appear to have been three main types of fortifications constructed:

- i) Completely new bastioned circuits, such as Oxford and Newark;
- ii) Bastions being constructed onto town walls, such as Colchester and Worcester; and
- iii) Fortifications connected by ditches and ramparts, such as London and Bristol (Bull 2008, 86). This type of all-inclusive defensive system could be referred to as an ‘enceinte’, which was a group of bastions and ramparts around a fortified town (Harrington 2003, 63).

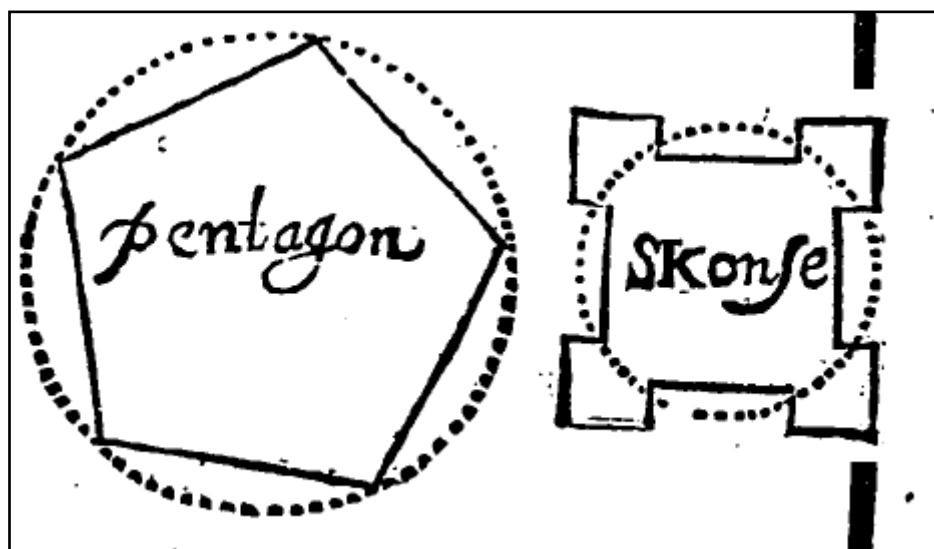


Figure 6: Pentagon and Sconce Illustrations (After Ward 1639, 38)

The ditch and rampart system for the iii) type would have been defined as a line of circumvallation, where the fortifications face open land, with the besiegers' works being defined as a line of contravallation to attack a town and to prevent a force from assisting the besieged (Harrington 2003, 63).



Many later articles on fortifications refer to sconces as ‘fortifications’; however, cartographic sources appear to show bastions, rather than sconces, as seen in **Figure 6**. A scone is a type of fortification, whilst four bastions form the essential elements of a scone.

#### 4.2.1 Bastions

The bastion was the essential element of the *Trace Italienne* fortification. Ward (1639, 60) states that bastions, referred to sometimes as ‘bulworkes’, should be regular and “large and spacious”; specifically, sconces should be thick and large (Ward 1639, 88).

Norwood (1639, 9, 32) describes a heptagonal fort with a curtain wall of 128m (420 feet), with a bulwark (bastion) being approximately 28 rods (280 feet = 85.34m). The length of the face of a bastion does not appear to have changed after the English Civil War, as, according to Staynred (1669, 1), the face of the bastion should be a maximum of 280 feet (85.34m).

The evidence from Norwood (1639, 22, 32) demonstrates that a fortification begins with a polygon, and, regardless of the number of bastions required, a bastion face should be a maximum of 85m in length. This is well within the weapon ranges of the period.

One of the most common examples of bastions can be seen in the famous scone design shown in **Figure 7**. This illustration epitomises the three main central elements of the fortification. Cannons are positioned on the flanks, providing covering fire along the curtain walls, with a key emphasis on thick and large bastions.

When comparing **Figures 6** and **7**, Ward shows two different designs of the scone. **Figure 6** shows flanks and curtain walls at 90°, whilst that angle in **Figure 7** is less than 90°. This evidence demonstrates that even in the same book, differences in construction style appear.

Occasionally, additional defences were added to the bastions. Wooden spikes are seen protruding from the bastion (and curtain walls) of the fortification of Breda (Ward 1639, 96). The bastion was the central element in providing offensive attacks, with cavaliers (raised earth) constructed inside for better field of fire and/or visibility.

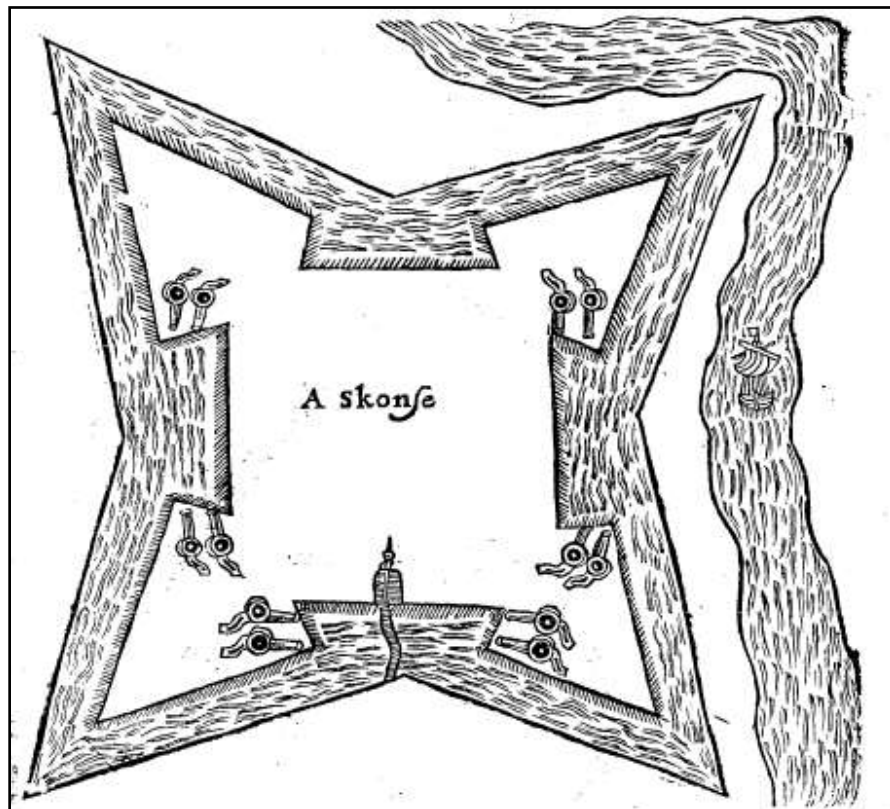


Figure 7: The sconce design (Ward 1639, 88)

**Figure 8** illustrates the use of “palilado’s” (palisades), which were usually around 3 feet (0.914m) long and sometimes contained iron spikes. **Figure 8** also shows “gabions”. Gabions were wooden baskets, referred to as “Canon-baskets” (Stone 1645, 31), which were filled with earth and were sometimes 10 feet high (3.04m). They were placed between cannons to protect them and were often used in place of parapets (Stone 1645, 31–32). What this information demonstrates is that basic materials (earth and wood) were used in great quantities. Stone advocates using large amounts of wood, which would have no doubt had a significant impact on resources, not only in supplying the material but also in shaping it and correctly positioning it in order to maximise its effectiveness in the overall scheme of the fortification construction.



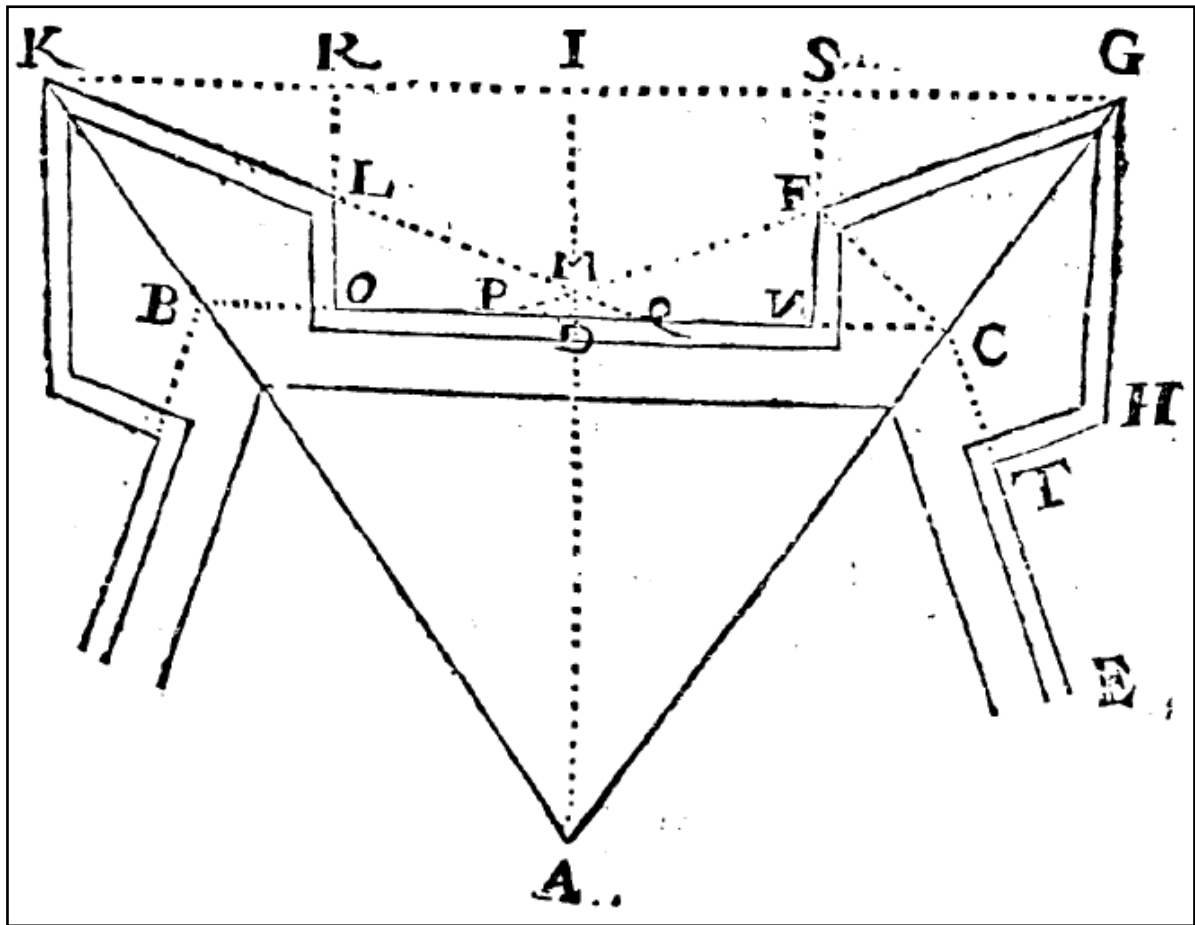


Figure 9: F, N and C illustrate that the angle to create the flank should be  $40^\circ$ , meaning that the curtain wall and the flank are at  $90^\circ$  and perpendicular to each other (Norwood 1639, 18)

The perpendicular angle of the flank to the curtain wall can also be seen in other, specifically offensive, works, in particular hornworks (Figure 10). What the hornwork shows is that small bastions are linked by flanks from a small curtain wall at  $90^\circ$ . This fortification was utilised at London and Chester (Osborne 2004, 15).

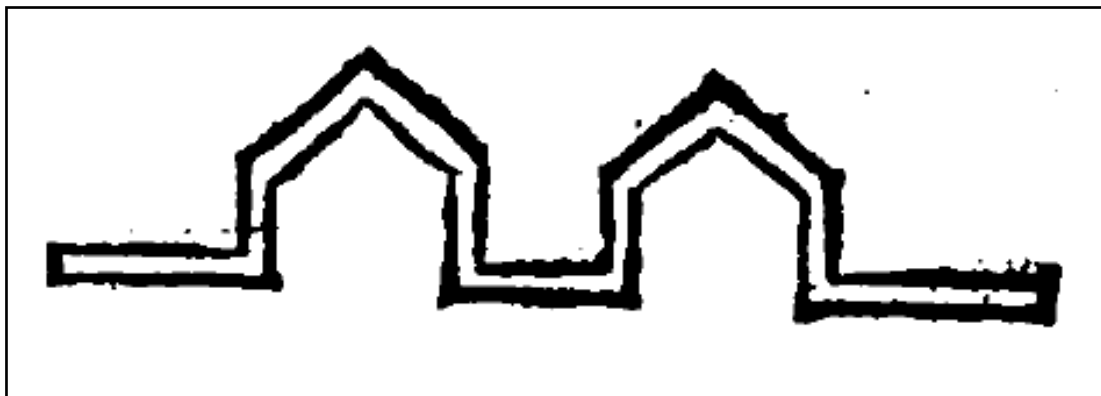


Figure 10: A hornwork (Ward 1639, 48)

### 4.2.3 Ramparts and Ditches

The ramparts were created by using the earth taken out of the ditch, with Ward (1639, 61) suggesting that a wall “or foundation of the Fort...bee thirty foot high” and the “Rampier above the foundation of the Wall, ought bee likewise 30. Foot in height; and 20. Foot broad”. For the purpose of this thesis, focus will be maintained on the rampart and ditch, not the additional wall, as reference to it does not appear in other literature (see Norwood 1639, 144; Harrington 2003, 63), although Papillon (1645, 17) and Ive (Stephenson 2008, 110) do mention a wall foundation, with the latter noting “the weight of the rampart that shall be laid against it” (Stephenson 2008, 110). The ditch should be “140. foote broad” (42.67m), with Norwood (1639, 112) noting that if a ditch is constructed on low-lying ground (near the water table), it would have to be broader to be effective. The tools used to excavate earth had not changed since Tudor times, which included pickaxes, spades and mattocks (Hexham 1637, 74; Stephenson 2008, 93).

Papillon (1645, 16–17) states that the necessary height of a rampart should be 30 feet (9.14m), with curtain walls of between 160 (146.30m) and 200 yards (182.88m) in length. Ward (1639, 60–61) describes the key measurements of fortifications; for example, he states that the ditch should be 30 paces wide (45m). (It is presumed that the ditch should be of sufficient width to stop cavalry in an assault.) The ramparts should slope as much as possible (Ward 1639, 61). A fortification constructed to these dimensions would have been an impressive and formidable feature in the landscape.

Papillon’s (1645, 59) analysis of Ward’s (1639) work is critical. This highlights a theoretical and mathematical debate, no doubt based on Papillon’s experience of war in the first Civil War. Papillon is supportive of the French engineer Errand de Barleduck, and he appears to favour an obtuse angle of the bastion. Specifically, in relation to Ward, Papillon states that he was mistaken (Papillon 1645, 59–60). Papillon (1645, 60) also discusses the use of half-moons. This may have something to do with the fact that Ward was in favour of using the Dutch designs for fortifications. However, Norwood (1639, 7) is also critical of “Errard Barleduc” – no doubt the same person. The principle is the same: a bank and ditch construction, earth lined, with the main argument being the angle of the bastion.

The soil of the ground would have impacted on construction decisions; for example, Hexham (1637, 13) notes the problems of sandy soil. The workmen used were divided into teams, some to dig and some to move earth. Initially, the earth would have been moved by horse and cart, but, later, when the rampart became steeper, planks would have been laid to carry the earth out using wheelbarrows (Norwood 1639, 92–93).

Covering turf should be 4–5 inches (12.7cm) in width, 14–15 inches (38.1cm) in length and shaped “like a wedge” (Norwood 1639, 93) (**Figure 11**). Stone (1645, 35) explains that the ‘wedge’ is cut in a triangular shape so that the rampart achieves its slope (as seen in C and D in **Figure 11**) and is fixed together as shown in B. The initial foundations are secured by using a “saucidge” (A) (‘sausage’): a stake between one and two feet (30.48-60.96cm) in height, tied together with “brush wood” (Stone 1645, 34). The foundations are specifically secured near the ditch (moat), with any water moved into the moat (Stone 1645, 34). Hatchets are used to cut the wood (Hexham 1637, 74).

**Figure 11** also illustrates another use of wood: the turnpike. The turnpike was designed to stop people and horses at the entrance to the fortification. It was between 12 (3.65m) and 13 feet (3.96m) long and half a foot (15cm) in width, with iron at both ends (Stone 1645, 36–37).

Both Norwood (1639, 125) and Ward (1639, 61) note that ramparts should have parapets, 8 feet (2.43m) in height and 30 feet (9.14m) in length, supporting them and suggest that brick or stone should be used in the foundations to “beare up the Fortifications of Earth” (Ward 1639, 61).

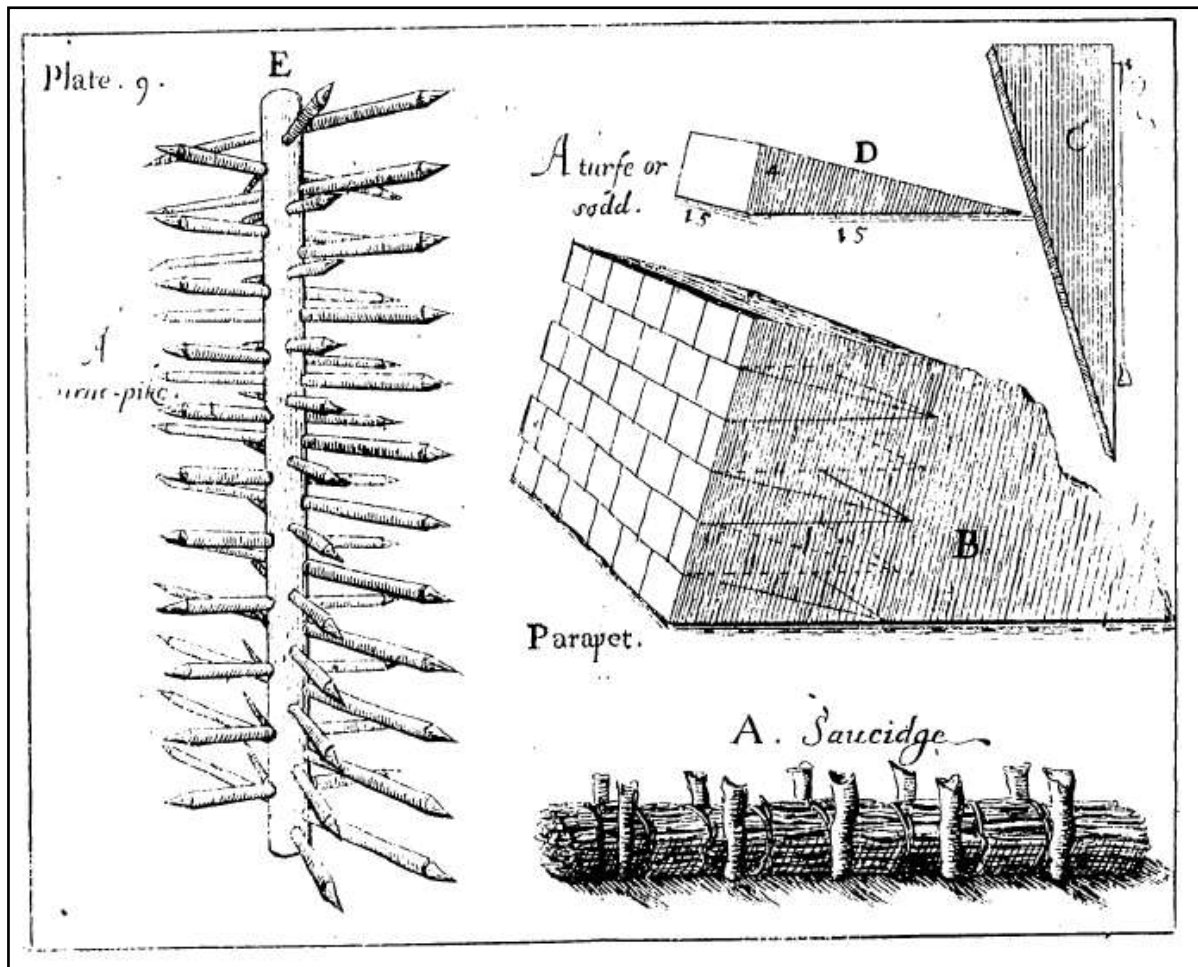


Figure 11: B, C and D illustrate how earth and turf should be used to form the rampart (Stone 1645, Plate 9 between pages 36-7)

#### 4.2.4 Glacis

As **Figure 12** demonstrates, the bastions might have contained a parapet followed by a ditch and a covered way (protected by the parapet), a palisade, and then a glacis. What **Figure 12** does not demonstrate are any stake holes or storm poles protruding from the bastion.

Would it have been possible for people defending a single position or town/city to construct what appears to be a very elaborate defensive system (complete with parapet, scarp, counterscarp, covered way, palisade and glacis) in a short period of time?

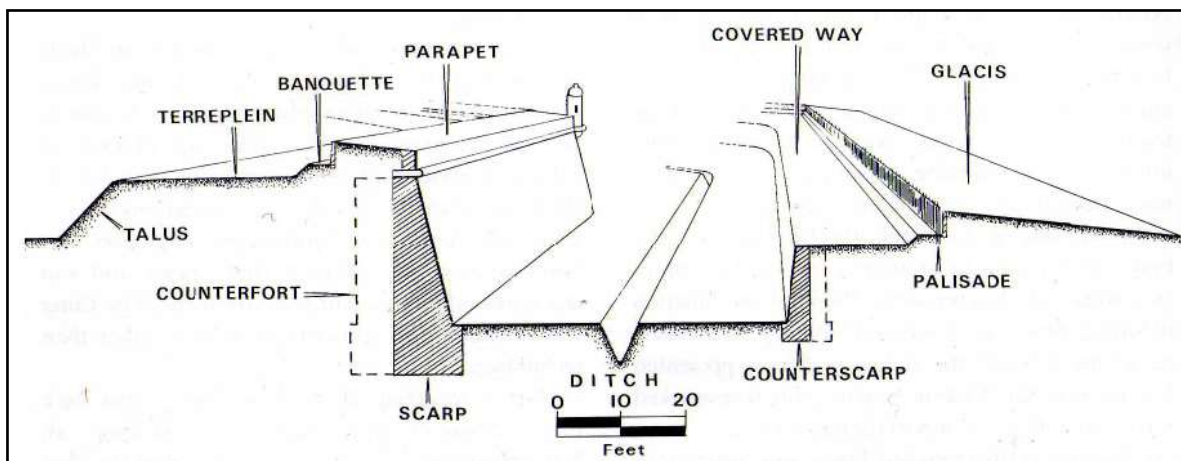


Figure 12: The profile of a fortification – too elaborate for the Civil War? (Duffy 1985, 2)

#### 4.2.5 Demi-Bastions and Half-Moons

Half-bastions and half-moons were just two of the key elements combined with the hornworks to provide additional defensive support to bastions. As **Figure 13** illustrates, demi-bastions (half-bastions) were sometimes employed, with small earthen constructions (half-moons) providing additional covering positions.

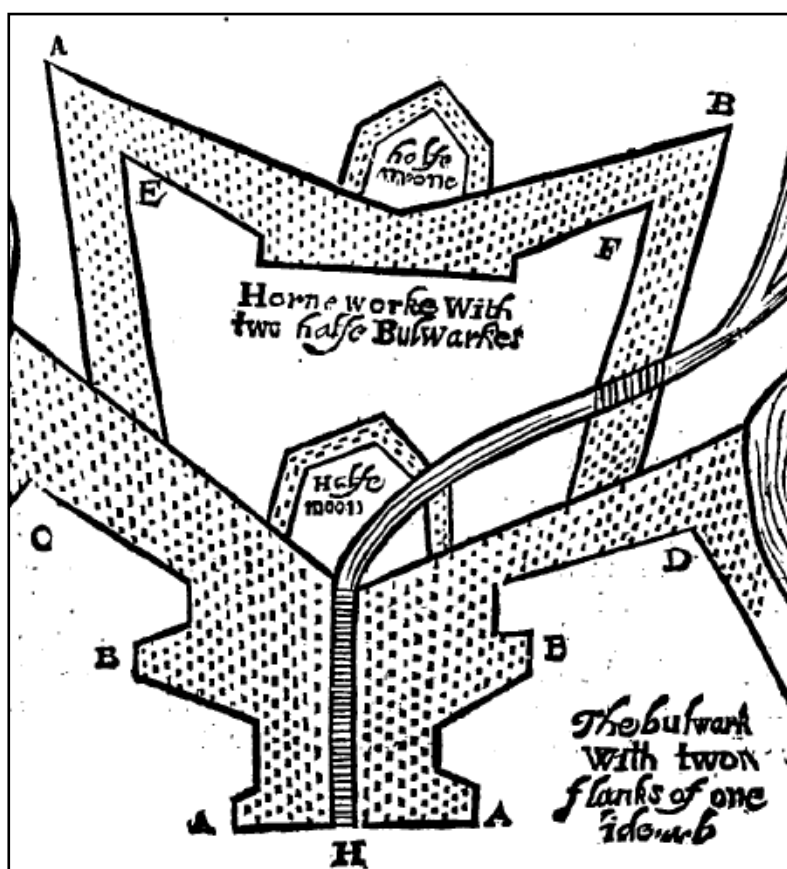


Figure 13: A series of half-moons and demi-bastions (Extract of Ward 1639, 48)



#### 4.2.6 Spurs

Spurs are small triangular fortifications that appear as bastion faces protruding from the main defensive line. Spurs require less construction than bastions, as they omit the flank from the earthen rampart line. A spur usually held an artillery piece (Osborne 2004, 18).

#### 4.2.7 Internal Dynamics

**Figure 14** illustrates the complex nature of the internal layout of 17<sup>th</sup>-century fortifications. The internal space is divided into small streets, which would have contained different camps for foot and regiment soldiers, along with areas for horses. At the head of specific regiments, for example the cavalry, captains and colonels would be set up in tents. In **Figure 14**, M indicates pikes and N denotes pikes and muskets. Carters, carpenters, butchers and smiths are also given space inside the fort. Q denotes a marketplace, which provides space for butchers, cooks and bakers, amongst other trades. Shoemakers and tailors are also given space to set up workshops. The area indicated by P is space for the storage of munitions and its officers (Ward 1639, 34–36).

Whilst Ward refers to a variety of purpose-built and designated storage areas for men, horses and equipment, it is interesting to note that Courtney (2006, 174) explains that large barrack blocks did not appear in English fortifications until the later part of the 17<sup>th</sup> century.

#### 4.2.8 Platforms

The ability to successfully fire at and hit a target relies on having a suitable platform. Eldred (1646, 34) used both stone and timber platforms and felt after considerable experience that if a cannon were used within a castle or fort, a stone platform would be preferred. This is because he found that stone platforms were more durable and required less attention and repair time compared to timber ones. He further notes that timber platforms tend to warp in the hot sun and become so wet and slippery in bad weather that the gunners cannot stand safely upon them. Whether a platform was made of stone or timber, it should have been 17 feet (5.18m) in breadth, with a height of 4 inches (10.16cm) and a length of 110 feet (33.52m) (presumably, the length is a given error). Wheel to wheel, guns should be placed at least 5 feet (1.52m) apart (Eldred 1646, 35).

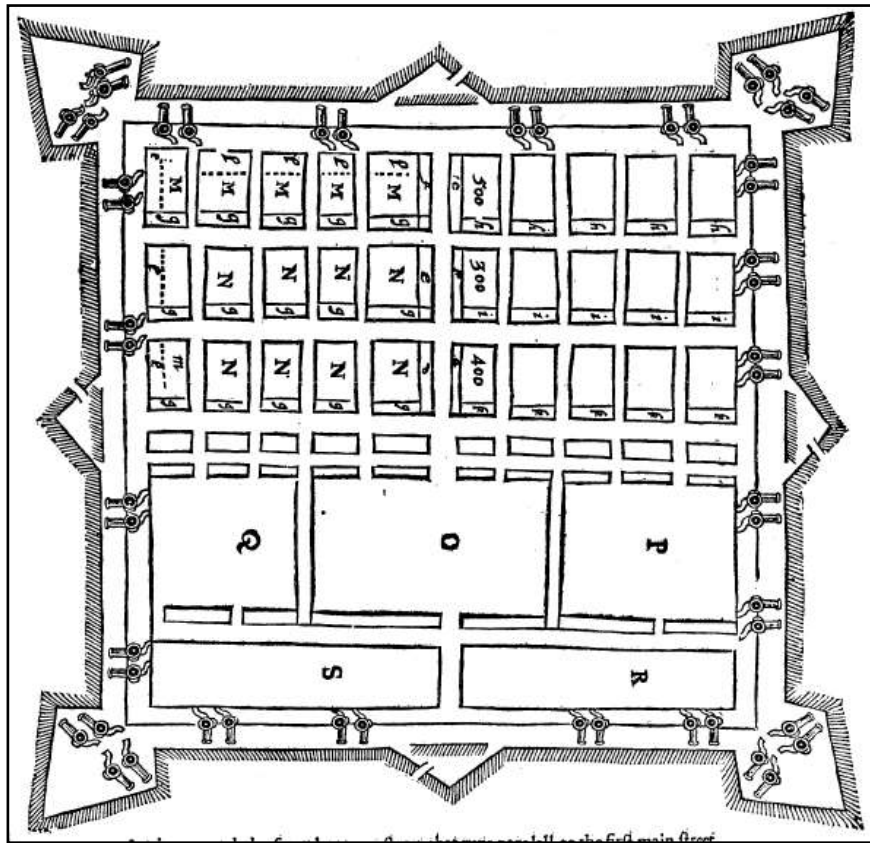


Figure 14: Division of men and materials inside a fortification (Ward 1639, 35)

#### 4.2.9 Sandown Fort – the ‘Perfect’ Fortification

To determine whether Civil War fortifications were built to the designs advocated in the manuals of the period, fortifications throughout England were examined. Sandown Fort on the Isle of Wight might have been the ‘perfect’ fortification.

Designed by Chief Engineer Thomas Rudd, a basic square of 200 feet (61m) was constructed with acute-angled bastions at each corner, with flanks to the ramparts. Turf was faced with stone, and a wet ditch surrounded the fortification. A drawbridge was constructed on the north section, with a brick governor’s house, store buildings and barracks. Cantwell and Sprack (1990, 52) state that the fort took six years to complete; however, according to Jones (1968, 172), it took four years.

Objections were made to constructing the fortification on alluvial clay, along with a high-water table; another objection was that there was only 24.38m between the sea and the two southern bastions. However, work began on the fortification (**Figure 15**) in July 1632, starting with excavating the moat of 16m in width and constructing a stone revetment. Two kilns were constructed on site; turf for earthen ramparts came from a variety of sites, including

Sandown Common. Limestone, sandstone and chalk were all required imports to the site. Bricks, plaster and timber were all imported from the mainland (Jones 1968, 175–179).

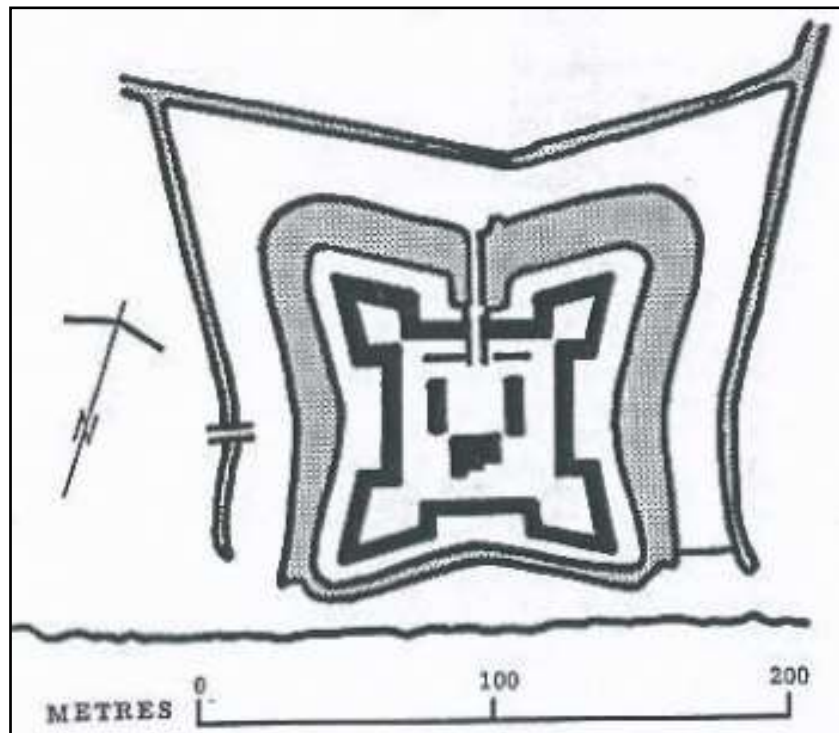


Figure 15: Representation of Sandown Fort 1632–1636 (Jones 1968, 173)

What this information illustrates is the complex nature of constructing a stone-revetted fortification. The kilns constructed for limestone and the importation of sandstone, chalk and turf suggest a wide variety of men with different skills on site. Along with construction taking several years, this implies a different environment and mindset to those of constructing a fortification under the threat of attack and the potential shortage of materials and men during the Civil War.

Overall, regardless of the number of polygons, fortifications followed (in an idealised world) a regular and specific pattern. **Table 1** combines the measurements given by Norwood (1639). This illustrates the typical measurements of ramparts, bastions and ditches for fortifications consisting of 4–6 polygons. The main differences lie in the length of the flank and the angles of the bastion. The depth of the ditch and the thickness of the ramparts are taken from very specific sconce fortifications, which, as previously discussed, emphasise thick bastions and ramparts. This information shows the immense task facing engineers when deciding to site a fortification. Would it have been possible to excavate a ditch of 1.82–2.43m and construct a rampart of, at most, 12.19m thick? This table of information also raises the

premise that different fortification designs could have been combined in order to provide the definitive model.

**Table 1: Fortification measurements (Norwood 1639, 36–37, 143–144)**

| Norwood (1639)         | Length of Curtain Wall | Length of Bastion | Width of Ditch (at Top)                              | Depth of Ditch                    | Length of Flank                             | Angle of Bastion | Thickness of the Rampart                            |
|------------------------|------------------------|-------------------|--|-----------------------------------|---|------------------|---|
| <b>4-Sided Polygon</b> | 42 rods<br>128m        | 28 rods<br>85.3m  | 30, 36,<br>54 feet<br><br>9.14,<br>10.97,<br>16.45m  | 6–8<br>feet<br><br>1.82–<br>2.43m | 9 rods<br>3 cent.<br><br><i>c.</i> 27.43m   | 60°              | 24, 30 or<br>40 feet<br><br>7.31, 9.14<br>or 12.19m |
| <b>5-Sided Polygon</b> | 42 rods<br>128m        | 28 rods<br>85.3m  | 30, 36,<br>54 feet<br><br>9.14,<br>10.97,<br>16.45m  | 6–8<br>feet<br><br>1.82–<br>2.43m | 10 rods<br>22 cent.<br><br><i>c.</i> 30.48m | 69°              | 24, 30 or<br>40 feet<br><br>7.31, 9.14<br>or 12.19m |
| <b>6-Sided Polygon</b> | 42 rods<br>128m        | 28 rods<br>85.3m  | 30, 36,<br>54 feet<br><br>9.14,<br>10.97,<br>16.450m | 6–8<br>feet<br><br>1.82–<br>2.43m | 11 rods<br>13 cent.<br><br><i>c.</i> 33.52m | 75°              | 24, 30 or<br>40 feet<br><br>7.31, 9.14<br>or 12.19m |

### 4.3 17<sup>th</sup>-Century Weaponry

In order to contextualise the fortifications, it is necessary to examine the weaponry of the period. A brief analysis of the main weapons is examined below.

#### 4.3.1 Pike

The pike was one of the central elements of 17<sup>th</sup>-century warfare (**Figure 16**). By the end of the Elizabethan era, infantry consisted of pikemen in the centre, flanked either side by musketeers: “40 pikes, and 40 muskettiers” (Hexham 1637, 21). The pike should be “seventeen foot long” (Anon. 1638, 2) (5.18m), with the diameter of the staff being 1¾ inches (4.44cm). The head should be 8 inches (20.32cm) in length (Anon. 1638, 2).

#### 4.3.2 Muskets

Three types of muskets were available: the matchlock (**Figure 17**), the flintlock and the wheellock. The barrel of the musket must be 4 feet (1.21m) in length (Anon. 1638, 2). In 1625,

Markham (1625, 2, as cited by Tallett 1992, 22) noted that “the squarest and broadest [men] will be fit to carry musquets, and the least and nimblest may be turned to the harquebus”. Hexham (1637, 19) illustrated the 16 steps required to fire the musket and explained that due to its weight and length, the weapon required a rest. It appears that the predominant musket was the matchlock, as Hexham (1637, 20) refers to the fact that the musketeer must “blowe his match well”.

The musket ball was predominately made of lead and was distributed from a central location. Soldiers had from the 1500s been expected to cast their own shots in their own moulds, as the bore for each weapon was unpredictable (Harding 2012, 27).

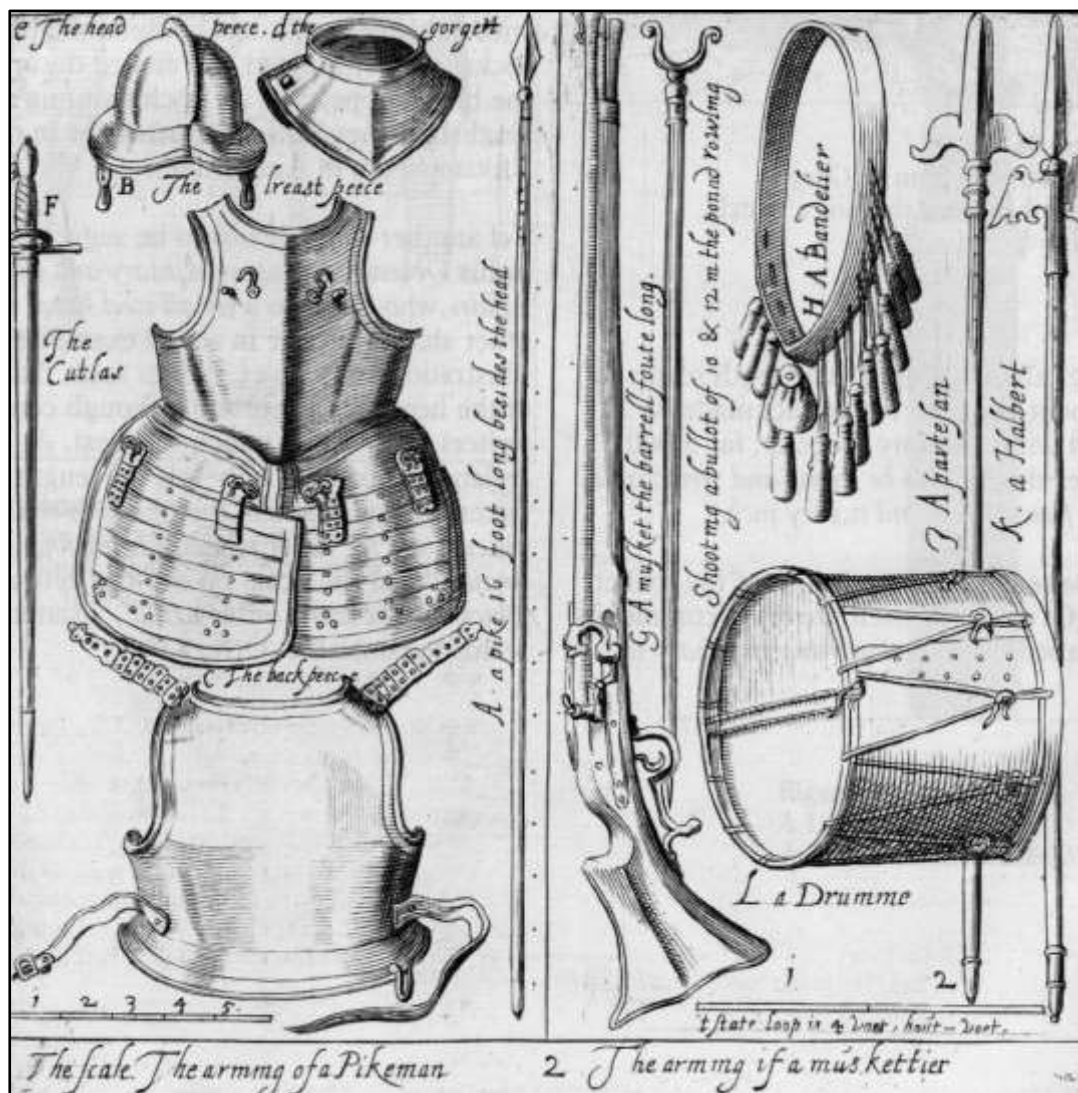


Figure 16: The pike and other weapons (Blackmore 1990, 75)

### 4.3.3 Cavalry

Cavalry played an important role in early modern warfare. Their role involved working as guides, obtaining intelligence and scouting (Cruso 1644, 26–27), as well as partaking in

battles/sieges. Cruso (1644, 16) states that the lance had a minimal impact on “spacious, hard, and, uneven ground”. Whilst this statement may be true, **Figure 18** shows cavalry charging on undulating ground.



Figure 17: A matchlock musket (Blackmore 1990, 68)

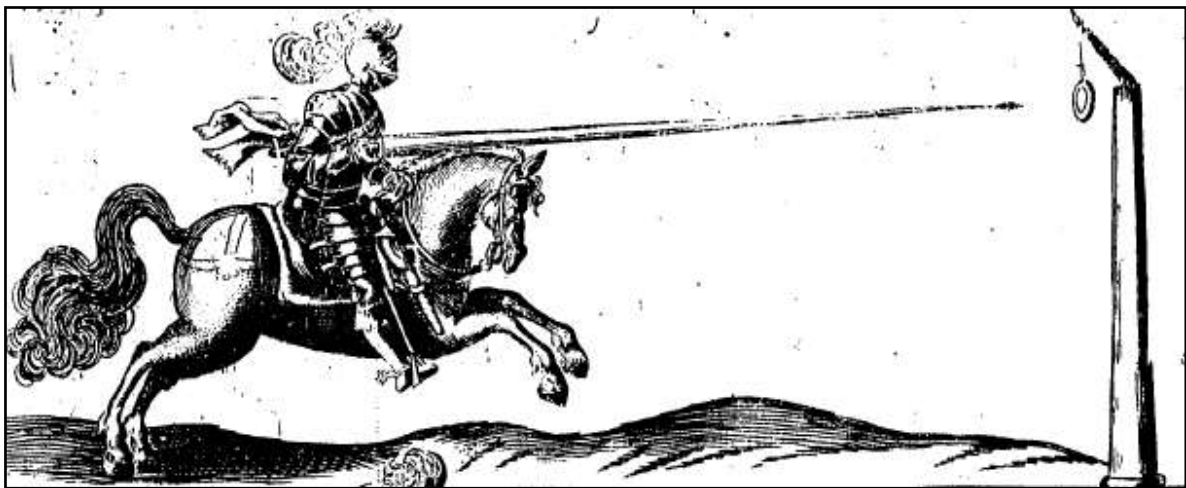


Figure 18: Charging with a lance slightly aloft (Cruso 1644, 17)

#### 4.3.4 Artillery

There are limited secondary sources regarding the construction, design, size and usage of the early post-medieval cannon; indeed, only Hogg (1963) (*English Artillery 1326–1716*), Henry (2005) (*English Civil War Artillery 1642–51*) and Bull (2008) (*The Furie of the Ordnance: Artillery in the English Civil Wars*) appear to debate the subject.

The most commonly available gun was made of bronze (a mixture of tin and copper), although iron was also used (**Figure 19**) (Henry 2005, 4).



Figure 19: A bronze 4-pounder cannon cast by John Browne in 1638 (Blackmore 1990, 83, figure 104)

Guns could be categorised into two categories: the battering type and the culverin type. Battering or siege guns consisted of the cannon, the Perrier and the demi-cannon. The culverin type usually fired a lighter shot and theoretically had a longer range of fire. The term ‘culverin’ refers to a particular gun but also a group of guns. Guns of this class also included the saker and the falcon. Guns’ categorisation is further complicated with the introduction of the term’s ‘drake’ and ‘bastard’. ‘Drake’ refers to a shorter and lighter weapon than that of the culverin, so this weapon is sometimes referred to as a ‘drake-culverin’. The term ‘bastard’ refers to a gun that had a specific weight and calibre (whatever those might be) but did not have a specific length. Cast iron was the most common type of shot used during the 17<sup>th</sup> century, but lead and stone were also used, if necessary (Henry 2005, 9–10, 18). Sieges generally involved very specific artillery – culverins, cannons and demi-cannons – whilst demi-culverins and smaller weapons were used in the field (Blackmore 1990, 83); however, Barratt (2009, 4) describes the demi-culverin as a weapon frequently used against forts. Henry (2005, 9) includes the Perrier in the category of siege guns. These apparent disagreements illustrate the complex nature of 17<sup>th</sup>-century artillery. As this thesis is involved in the examination of fortifications, it is not the intention of this thesis to re-evaluate the historian’s analysis of artillery.

Based on analysis of the historical information of available cannons (e.g. Smith 1600, table between pages 87–88; Norton 1628, 52–53; Ward 1639, 109; Eldred 1646, 15; Nye 1670, 74–79), the most common artillery types available and utilised during the Civil War were the demi-culverin, saker, minion, falcon, falconet and robinet (although the demi-cannon, whole cannon and cannon royal are also discussed) (**Table 2**).

**Table 2: Artillery, shot weight and range (Atkin and Laughlin 1992, 86, based on Ward 1639, 109)**

| Cannon        | Shot (lb)        | (kg) | Range (paces) | Range (metres) |
|---------------|------------------|------|---------------|----------------|
| Demi-culverin | 11¾              | 5.32 | 380–1,800     | 253–1,200      |
| Saker         | 5¼               | 2.38 | 300–1,500     | 200–1,000      |
| Minion        | 3¼               | 1.47 | 280–1,400     | 186–933        |
| Falcon        | 3 <sup>1/3</sup> | 2.41 | 260–1,200     | 173–800        |
| Falconet      | 1 <sup>2/7</sup> | 0.58 | 220–1,000     | 146–666        |
| Robinet       | ¾                | 0.34 | 150–700       | 100–466        |

The table shows that the demi-culverin had the longest range and heavier shot, with this pattern continuing to the smallest artillery piece, as the robinet held a point-blank range of 100 metres, with a farthest shot of 466 metres.

The evidence examined here regarding the artillery and more specifically the ranges of the cannon will be utilised in the GIS analysis of where the fortifications and artillery pieces were sited in the landscape.

#### **4.3.5 Attack**

The literature of the period does give suggestions on how to destroy the curtain walls and bastions of most modern fortifications. One of the most informative illustrations is from Hexham (1637, 25) (**Figure 20**).

The upper illustration shows the use of gabions to protect the artillery. The artillery is divided into five sections, with the main baulk directly facing the curtain wall. The central aim appeared to be removing the central area of the curtain wall, with the two far sides focused on attacking the flanks of the bastion. The lower illustration shows how artillery besieges the bastion (bulwark). The focus of the artillery was to attack the two faces of the bastion, with defending fire coming from two flanks of the other bastions. The bastions appear to have been utilising, in part, the orillon design of flanks. What these two illustrations reveal is where artillery was, at least according to Hexham, required to be sited to effectively maximise their ability to damage/destroy fortifications.



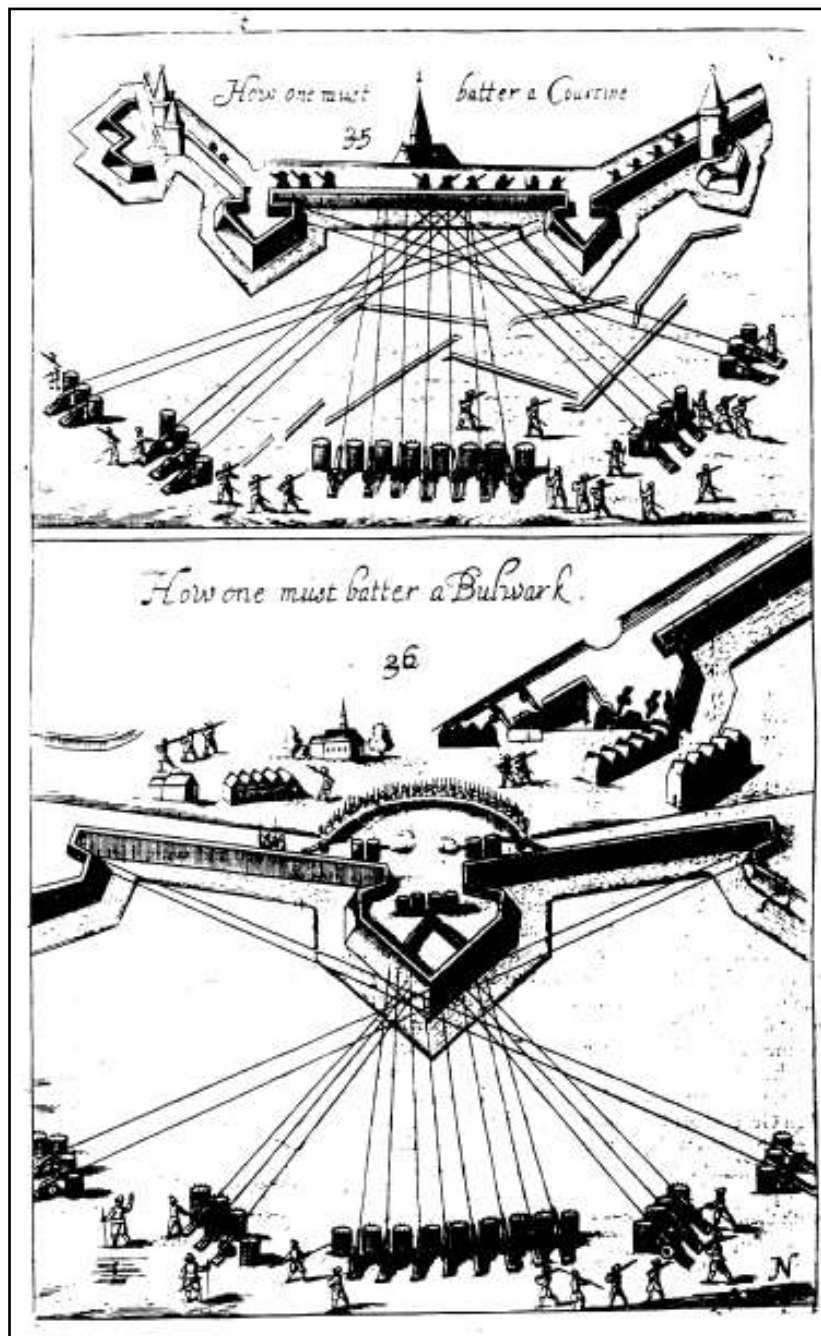


Figure 20: How to attack a curtain wall and a bastion (Hexham 1637, 25)

#### 4.4 Summary

Alongside the use of the pike, muskets and cavalry, the increasing development of the cannon ushered this new and catastrophic weapon firmly into the eyes of tacticians and commanders onto English soil and into the minds of the notable tacticians and commanders of the day. The evidence demonstrates that there were a wide variety of artillery pieces, varying in size, shape, design and role, illustrating that, in some respects, artillery was still in its infancy.

Accompanying this wide variety of weapons were equally (sometimes bewildering) geometric and stylistic attempts at designing defensive and offensive fortifications to

counteract the increasing array of artillery. Whilst the tools for construction were basic, these new fortifications, whether following the theoretical ideas of the Dutch or the French, or perhaps a combination of the two, led engineers and commanders having a monumental task attempting to fathom what to build and where it should be built, the led engineers and commanders of the day were faced with the monumental task of ascertaining what should be built and where to build it.

The following chapters on Bristol, Gloucester and Worcester will respectively examine the geological, topographical, cartographic, historical, archaeological and GIS analysis regarding the fortifications constructed.

## **Chapter Five: The Fortifications of Bristol**

### **5.1 Introduction**

This chapter examines the fortifications of Bristol during the Civil War. To do this, the placement and impact of the fortifications in the landscape are scrutinised by studying the underlying geology, topography, historical documentation, cartographic evidence, GIS viewshed analysis, including cartographic regression, and the results of archaeological excavations.

### **5.2 The Sieges of Bristol (1643 and 1645)**

#### **5.2.1 The 1643 Siege of Bristol**

In the summer of 1642, Bristol ordered its medieval gates to be repaired and artillery to be placed on its walls, with the rivers Frome and Avon conducting a role in the defence of the city. The medieval walls were 7 feet (2.13m) thick with seven interspersed towers and a ditch 24 feet (7.31m) wide and 9 feet (2.74m) deep. In November, plans were made to reinforce the castle with a new floor capable of taking the weight of Civil War artillery. By December, Parliament troops had entered the city. Work to defend the city started in February 1643 with the construction of an earthen fort on Brandon Hill. St Mary Redcliffe Church was fortified and manned with three artillery pieces; an additional 25 cannons were mounted on the walls. The north and east of city had a line of earthworks constructed, three miles in length but of poor condition. The defensive circuit was four miles in length. Construction of all the fortifications was expensive, costing £1,000 per week – approximately £50,000 in today's money (Ball 1642, 3; McGrath 1981, 19–20; Barratt 2009, 27–28).

From the west, the fortifications started by overlooking the River Avon at the Water Fort, which was of earthen construction and, according to Russell (2003, 13), lined with turf or earth. The fortifications moved north to Brandon Hill; from here, the line moved east towards the Essex Work (or Essex Fort). The defensive line then ran north-east towards Windmill Hill Fort (later the Royal Fort). The line continued north towards Colston's Fort. From here, the line continued in a north-east direction towards Prior's Hill Fort. Therein lies the main fortifications constructed and adapted by both sides during the conflict. In addition, there was a spur at Stokes Croft, along with works at Lawford's Gate, Gloucester Lane, Tower Harrazz, the Portwall and the Watergate.

Historical evidence from Samuel Fawcett's artillery list of 28<sup>th</sup> July 1643 sited the documented positions of fortifications located "Over the Bridge". From Temple Gate, the line

branched into two: firstly, directly west to Redcliff Gate; secondly, in a south-south-west direction to a spur covering Temple Gate. The second line continued in a curve to another spur: a platform behind Redcliff Church. The line continued to a further spur and then turned west to Bedminster Gate. Finally, the line turned to the north-east at a demi-bastion at Trin Mills. Inside this line, and directly to the south of Redcliff Gate, was St Mary Redcliffe Church (Russell 2003, 29–30).

A further defensive line was the Marsh Wall running between the rivers Avon and Frome. The wall contained three gates: Marsh Gate, located on Welsh Back, Back Street Gate, which ran across the modern road of Queen Charlotte Street, and Marsh Street Gate. A battery was constructed in the marsh to command the river (Russell 2003, 30–31).

Inside the city, Bristol Castle continued to dominate the immediate landscape, despite being in decline. The castle was defended by a redoubt. Near to the castle was a guardhouse located at the south section of Wine Street. The city also contained several gates: St Nicholas's Gate, St Leonard's Gate, St John's Gate, Newgate, Nether-Pithay Gate and Frome Gate (Russell 2003, 31–33).

The Royalists approached Bristol from Oxford under the command of Prince Rupert. The artillery train contained four types of heavy siege pieces: two demi-cannons firing 27-pounders (12.24kg), two culverins firing 15-pounders (6.80kg), two quarter-cannons (*c.* 12-pounders) (5.44kg) and two 6-pounders (2.72kg). The mortar was under the command of Samuel Fawcett, with de La Roche in overall control of the artillery. On 23<sup>rd</sup> July 1643, with the Royalists closing in on the city, Prince Maurice sited gun batteries opposite Temple Gate, with work continuing establishing batteries to attack Windmill Hill Fort and Prior's Hill Fort. A Royalist battery, which contained two demi-culverins, saw a brief engagement whilst it was being constructed near Brandon Hill Fort (Peachey 1993, 8; Barratt 2009, 28–29; Lynch 1999, 72). Lynch (1999, 71) states that the two demi-cannons would have been awkward to use effectively, whilst the two 6-pounders would have been ineffective as siege pieces.

On 25<sup>th</sup> July 1643, Princes Rupert and Maurice met to discuss their final plan to storm the city, rather than conduct a formal siege, due to a lack of ammunition and illness in their troops. A formal siege was like a 'way of approach', which was designed to move the besiegers' works closer to the defences with a plan to mine the defences and/or create a breach (McGrath 1981, 22–23). Around 3am, earlier than planned, Lord Grandison's *tertia*, with two troops of musketeers either side, each containing 50 men, attacked Prior's Hill Fort. Lieutenant Colonel Lunsford, along with 300 troops, attempted to attack a position near the fort and failed. The spur at Stokes Croft was also attacked, with Grandison focusing his attack on Prior's Hill Fort.

According to Barratt (2009, 31), this was not palisaded, although McGrath (1981, 24) states that it was; based on de Gomme's account, the fort was palisaded. Grandison's troops were unable to go farther than the ditch because scaling ladders had not arrived; Lunsford himself found a ladder but was unable to complete the task (McGrath 1981, 24; Barratt 2009, 30–31).

The attack on Windmill Hill Fort by the brigade of Bellasis was not going well; however, a breakthrough was made between Brandon Hill and Windmill Hill Fort, now known as 'Washington's Breach' (Barratt 2009, 32–33). Barratt (2009, 33) says that the Parliamentarians were unable to defend the position (at the Essex Work) because the artillery could not reach it.

The Essex Work was encountered by the Royalist forces at modern Park Street (according to Barratt 2009, 34), with Wentworth's men now being besieged by the Parliamentary artillery at Brandon Hill Fort and the Water Fort and by guns from across the river. Wentworth's troops managed to control College Green, whilst men under the command of Bellasis and Aston's cavalry attempted to assault Frome Gate, which had two gatehouses over Frome Bridge. A barrier described as 16 feet (4.87m) thick blocked their path, and by 9am they were still no farther forward. At Frome Gate, Mrs Dorothy Hazzard and approximately 200 girls and women with woolsacks of earth attempted to create a bulwark of 15–16 feet (4.57–4.87m), ordering gunners to continue to hold their positions. The fortifications on the high ground were still held by the Parliamentarians, as well as formidable (and unknown) inner defences. Despite this, morale amongst the Parliamentarians was fading, and Fiennes was unable to rally the troops, with only 200 out of 1,000–1,200 staying in the city centre. On the second call for parley from Fiennes, Prince Rupert accepted his surrender. Whilst the capture of Bristol was a success for the Royalists, they lost many men. For example, the Oxford Army had 4,000–5,000-foot soldiers at the start of the campaign; however, at the end, only 1,400 could be located, and Bellasis's command was dismantled due to failing numbers (McGrath 1981, 29–30; Barratt 2009, 34–37). Upon surrendering, Fiennes agreed to ten articles (Anon. 1643, 3–6), which was a strategic disaster for Parliament, as they were required to "leave behind them all Cannon and Ammunition" (Anon. 1643, 6).

### **5.2.2 The 1645 Siege of Bristol**

By 1645, the outer fortifications had been improved, including the expansion of Brandon Hill with a bastion and six artillery pieces. Windmill Hill Fort was transformed into the Royal Fort and was armed with 22 cannons, whilst Prior's Hill Fort was rebuilt and contained 13 guns. The work was conducted under the supervision of Bernard de Gomme and utilised conscripted

labour from the city and beyond; however, the construction suffered from a lack of manpower and financial issues. By August 1645, the city contained 151 guns (Barratt 2009, 38).

The Parliamentarians estimated the size of the Royalist garrison at 4,000 troops; however, after the conflict, Prince Rupert claimed that he had 1,000 cavalry, 2,500 infantries, and 800–1,000 auxiliaries and Trained Bands (Barratt 2009, 37–38).

On 23<sup>rd</sup> August 1645, Sprigg, Fairfax's Chaplin (1647, 100), noted that "the enemy's cannon played from the great fort and Prior's fort, but hurt none but one dragoon, who had had his thigh shot off". This suggests that despite a numerical increase in the number of artillery pieces, the reality was that it was difficult for the troops at both the Royal Fort and Prior's Hill Fort to maximise the effect of their weapons; indeed, it appears that Nicholas Hall (2015, pers. comm., 16<sup>th</sup> November) was correct when commenting that the "professional standard of a lot of gunners seems to have been very poor!" On 27<sup>th</sup> August 1645, the Royalists launched a sally from Lawford's Gate, which was unsuccessful. On 2<sup>nd</sup> September 1645, the Parliamentary Council of War decided against assaulting the city; however, a sub-committee recommended assaulting the east and south sides, bypassing the fortified northern side. Weldon's brigade and his three regiments of horsemen would focus their attack on the south. Mountagu and his two regiments of horsemen would attack Lawford's Gate and the section of defences between the two rivers. Rainsborough would attack Prior's Hill Fort and the defences between it and the River Avon, but the fort was his key target. An amphibious assault of 200 men and sailors would attack the Water Fort, and a brigade on Durdham Down would keep the forces at Brandon Hill Fort occupied (Sprigg 1647, 104–105; Barratt 2009, 39–41). As McGrath (1981, 38) notes, the focus would be on the line between Prior's Hill Fort to Lawford's Gate, rather than Prior's Hill Fort to Washington's Breach, and all the defensive line would have been harassed – a different approach to the Royalists in 1643.

The troops assaulting the southern defences were unable to scale them, as the scaling ladders were too short, whilst the troops attacking the eastern side were able to make several breaches in the defences. The regiments of Pickering and Mountagu successfully attacked the city near Lawford's Gate, capturing 26 artillery pieces. Parliamentary foot soldiers had broken through the northern defences, and Major Desborough of Fairfax's regiment of horsemen had reached Castle Street and secured a gate, whereupon the besieged withdrew from the medieval defensive wall. Fairfax and Sir Hardress Waller, with their regiments of foot soldiers, attacked the defences protecting the River Frome and came around to assault the defenders at Lawford's Gate, which Cromwell (Sprigg 1647, 125) described as a "double work" from the rear (Barratt 2009, 41–42).

Just to the north of the River Frome, Skippon's and Birch's regiments captured the enemy's guns and turned them against the Royalists. This led to the cavalry of Major Bethell providing support. After a brief clash, the cavalry regiments of Whalley and Rich, along with part of Greaves's, forced the Royalists to retreat to the "great fort and Coulston's-fort" (Sprigg 1647, 117). The plan to attack the Water Fort did not take place due to high tides; however, the seamen were utilised elsewhere in the attack (McGrath 1981, 41; Barratt 2009, 42).

The regiments of Rainsborough and Hammond, along with part of Pride's, attacked Prior's Hill Fort, which, according to Cromwell (Sprigg 1647, 126), was one mile from the River Avon. Rainsborough directly attacked the fort, whilst Hammond went below and behind to stop any reinforcements coming from the city. The Parliamentarians did not have ladders long enough to scale the fortification; however, the inner face of the fort was weak, and Hammond and his regiment were able to climb through the firing positions (Barratt 2009, 42–43). McGrath's (1981, 41) interpretation differs, as he states that the ladders were able to reach the top of the fortification. Sprigg (1647, 117) notes that "many", not all, ladders were too short. This may indicate that the planned attempt to storm the top of the fort was cancelled when it ran into difficulties and illustrates a disparity between the sources of Barratt (2009, 42–43) and McGrath (1981, 41). This may show that the fort did have a rampart of 30 feet (9.14m) high (Papillon 1645, 16; Ward 1639, 61) and therefore followed the recommended dimensions given in the manuals of the period. It may also suggest that the combination of the width and depth of the ditch with the height of the rampart was not sufficient to stop an advance.

By dawn, the Royalists had lost most of the outer fortifications, but they still commanded the castle and the Royal Fort and had victuals, according to Cromwell, for "one hundred and fifty men for three hundred and twenty days, the castle victualled for near half so long" (Sprigg 1647, 127). Sprigg (1647, 118) also comments that if the Royalists "had daylight when we first entered, we could not have stood upon any ground to have attempted Priors-hill-fort, in regard the great fort, and Coulston's-fort on the one side, and the castle on the other side, might have cut off our men as fast as they had been drawn up, but, being in the dark, they durst not shoot, for fear of killing their own men". With no possibility of relieving troops, despite Cromwell noting that they had around 140 cannons, a hundred barrels of gunpowder and numerous shots, the Royalists surrendered on 11<sup>th</sup> September 1645, with Prince Rupert withdrawing through the Royal Fort. Prince Rupert had failed to hold the city for the king and had put up less of a fight than the Parliamentarians had in 1643. For this, he was stripped of all commands and banished from England forever (Anon. 1645, 1; Sprigg 1647, 127; Barratt 2009, 43–44).

### 5.3 Topographic and Geological Analysis

Of the series of fortifications constructed (**Figure 21**), the Water Fort was topographically located at 20m aOD, with the fort at Brandon Hill occupying the highest point above the city at 79m aOD. The site of Windmill Hill Fort / the Royal Fort was at 76m aOD (Memory Map; King 2011, 2; 2012, 6). The site of Essex Fort was at 45m aOD, with Colston's Fort at 69m aOD and Prior's Hill Fort at 51m aOD; this downward topographical siting continued, with Stokes Croft at only 20m aOD to Bristol Castle located at 17m aOD and the defences by St Mary Redcliffe Church at 12m aOD (Memory Map).

What the above information illustrates is that the key fortifications of the Water Fort, Brandon Hill, Windmill Hill Fort / the Royal Fort, Colston's Fort and Prior's Hill Fort were built on high ground above and detached from the medieval city.

An analysis of the geological placement demonstrates the significance of the high ground, as the fortifications of the Water Fort, Brandon Hill and the Royal Fort were all built on a Quartzitic Sandstone Formation with loam clay of a light-to-heavy silty consistency. Generally, the soil overburden was low and combined with light-to-heavy clay, which is difficult to excavate, demonstrating the significance of obtaining optimum siting of the fortifications. The sites of Essex Fort, Colston's Fort and Prior's Hill Fort were constructed on Mercia Mudstone Group; the forts were constructed through and on medium-to-heavy loam clay (Geology Digimap 2016). The evidence demonstrates factors that could have inhibited and slowed the construction of fortifications, such as heavy clay, suggesting that this was deemed a strategic necessity in order to command the necessary high ground.



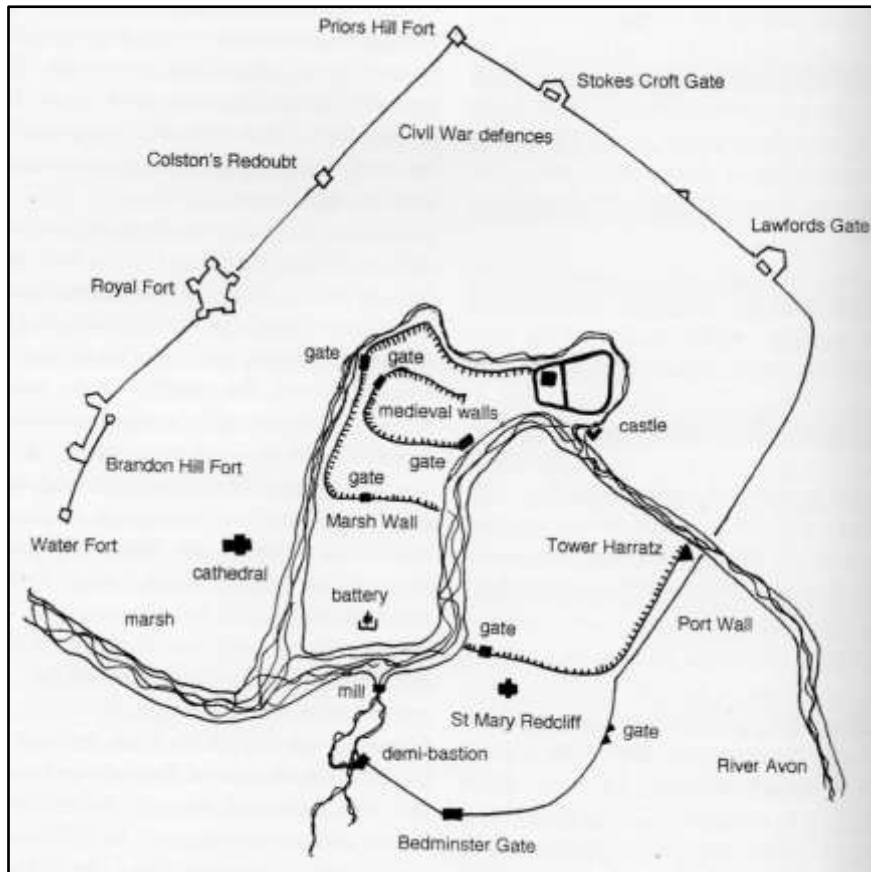


Figure 21: The fortifications of Bristol (Osborne 2004, 42)

## 5.4 Historical Analysis of Bristol

### 5.4.1 Bernard de Gomme's 1643 Account of the Fortifications

In 1643, Bernard de Gomme (1925, 184–185) described the Parliamentary defences of Bristol as follows:

*“The Cittye of Bristoll stands in a hole: & upon the Northside towards Durdham downe, be 3 eminenter knolls or rockye hills, now crowned with so many forts. Next the river on the Southern skirt of Brandon hill is the Water fort, & on the knapp of the hill more Northward, is Brandon fort it selfe, some 18 foote square, & as many high; its Graff or mote but shallow & narrow, by reason of the rockynesse of the grownd. This is the highest of the fort hills. From whence the Line or Curtayne runnes Eastward, down the hill at the bottom of which stands the Barne & Spurre, where wee first entred which is since calld Washingtons Breache. Thence trends the Line still eastward, up St. Michael’s hill on ye knoll of which stands the Windmill fort (though not fullye so Loftye as Brandon hill), yet with 420 passes by a Line of it. At the bottome of this, & upon the Highwayes side, stands Alderman Jones howse, with a Batterye crosse the way, which the Line crookes a Little northward to fetch in. Up the hill, againe, more*

*Easterlye, & within muskett shott, there is another Redoubt some 18 foote square, against w<sup>ch</sup> Col. Bellasses Batterye played. Within Lesse then Muskett shott of this, is Priorshill fort : fower square, ech side 24 of my passes. And hence trends the Line Southerlye, towards the Town where in the bottome of the hill in the medow calld Stokes Croft, upon Gloucester highway, & within Little more than half musket shot of Priors fort, there is a great Spurreworck in the Line, & a strong high Traverse, or Fore worck, watching & shutting up the highway, with a strong port of timber barres on the East side of it. And these be the mayn worcks wee had to attack on our side : having in all 5 Cavalliers or Batteryes : in the middle of everye twoe of which, be allso Little Ravelins or Tenailles, thrusting out sharp angles, to flanker & skowre along the Curtaine. I measured no further, because wee had to deale no further. These forts be all pallisadoed, but have no Fauxbrayes or fore-defences : nor on some sides, not so much as a Barm, Corridore, or footebank. Theyr drye rockye Graffs, be allso narrowe & shallowe. These forts command all the valley towarde Durdham downe, Northwards : & back againe over the whole Cittye, Southwards. Thorow all these forts from river to river, runnes a continued Line or Curtaine of meane strength & not comparable to those at Oxford. Its height, commonly, about a yeard & halfe : or 6 foote where highest. The thicknesse on the top, above a yard, usuallye. The Graff or Ditch, commonly, 2 yards broade, but somewhere a foote or twoe, more. The depth scarce considerable ; as being hardlye 5 foote, usuallye ; & in many rockye places not so deepe. The ditches about the Redoubts, ordinarilye, about 8 or 9 foote deepe, & and so much over.*

*And thus was the Cittye fortified on our Northside, but the Southside where Prince Maurice fell on, though it hath not such forts, yet is the Line there something stronger; besides that it is fenced with the River. The whole Circumvallation, is full 5 miles. The grownd in most parts is rockye, that it being at a Councell of warre debated, whither to fall on by Approaches, or by Storme : the former waye (though safer) was rejected, for that the Stonynesse admitts nor mines nor sapping. Within the Cittye, is a large old Castle : but weake, still : notwithstanding the Enemyes had something repayrd & fortified it. A Mote was begun ; & some howses pulled down for it. Tis wett, but in some places : nor hath it Fauxbrayes on all sides : & towards the South next the River, a Redoubt”.*

#### **5.4.2 Analysis of de Gomme’s 1643 Account**

Whilst de Gomme mentions three rocky hills, it is unclear to which three he was referring to, as it could have been Brandon Hill, Windmill Hill, Colston’s Fort and/or Prior’s Hill. Most likely, the three hills would have been the ones hosting the fortifications of Brandon Hill,

Windmill Hill and Prior's Hill, as Colston's Fort was sometimes referred to as a 'redoubt'; however, the term 'redoubt' appears to have been interchangeable with 'fortification' or 'citadel' throughout the period.

De Gomme's description of the location of the Water Fort signifies that the role of the fortification was to monitor activity on the River Avon, explaining the fort's placement in the landscape. The fortification at Brandon Hill was constructed on the highest point of a hill, enabling it to command the surrounding area. The fort is described as 18 feet (5.48m) square and 18 feet (5.48m) in height. If accurate, then, according to Norwood (1639, 112), if the fortification were four-sided, the height of the fortification would have been higher than the level required by the literature. However, Papillon (1645, 16) and Ward (1639, 61) both state that the rampart should be 30 feet (9.14m) high; therefore, the fortifications constructed by the Parliamentarians were smaller than those recommended by two military manuals of the period. Such a small fortification would not appear to be one built with flanks and/or bastions. The ditch was described as small because of the local geology. The problem of the local geology has been examined earlier in this chapter and continues to suggest that the placement of the fort was a priority. De Gomme continues his description of the defensive line (curtain), stating that a spur was positioned at the bottom of the hill. This is no doubt at the base of the hill between the high ground at Brandon Hill and where Windmill Hill was sited. This suggests a conscious attempt to control the 'valley pass' – the 'pivotal point'.

De Gomme acknowledges that the fort on Windmill Hill was located on a knoll, and indeed the toponymy of 'hill' suggests that. Unfortunately, no measurements for the size of the fortification are given, but it is reasonable to assume that it was of similar size and shape to the fort at Brandon Hill. The line continues 420 passes (paces?) (640.08m?) to Alderman Jones's house, with a battery nearby.

De Gomme describes the line moving up a hill and encountering a redoubt. This redoubt was Colston's Fort (Russell 2003, 25) and was within musket range (45.72–91.44m) (as suggested by Wanklyn and Jones 2005, 28) of the previous battery. Again, de Gomme describes this fortification as being 18 feet (5.48m) square. Within less than a musket shot (100 yards, 91.44m) was Prior's Hill Fort. As with Windmill Hill, the toponymy suggests that a fortification was placed here because of its view and command of the surrounding lower ground. As de Gomme describes Prior's Hill Fort as being 24 passes, Russell (2003, 25) suggests that it was approximately 25m square.

From here, de Gomme describes the defences turning south to a spur, with a forework. The forework might have been a half-moon or a ravelin. These features were at Stokes Croft

Gate (Russell 2003, 26) and were positioned at the bottom of the hill in a meadow. It is evident that fortifications were constructed here to control supply and communication routes and to utilise the existing defences, in this case the medieval gate into the city. Efforts to control movement were illustrated in the shutting of the highway (road) and utilising timber, probably in the form of turnpikes and/or sausages.

De Gomme states that these were the main defensive works, noting five cavaliers or batteries; presumably these were the Water Fort, Brandon Hill Fort, Windmill Hill Fort, Colston's Fort and Prior's Hill Fort. Between every two forts, it is noted that the Parliamentarians defended the curtain defensive line with smaller fortifications of ravelins or tenailles and smaller spurs. O'Neil (1960, 83) mentions that ravelins or tenailles would have been constructed inside the ditch.

All the fortifications are described as having palisades. Combining this information with de Gomme's account of Stokes Croft Gate being barricaded, this suggests the creation of access to surrounding woodland to cut it down for use in the defences. The fortifications are noted not to have additional defences for protection and movement, such as corridors or foot banks. A foot bank could be a communication route and/or protective cover for the movement of soldiers.

Each ditch is described as dry and showing small and shallow geology ("rockye"). De Gomme himself notes the reason for the placement of the fortifications to command the valley. The curtain / defensive line surrounding the city is described as 1.37m (1.5 yards) high – 1.82m (6 feet) at its highest point. The curtain is mostly described as being 0.914m (about a yard) thick, with the ditch 1.82m (2 yards) in width and occasionally 0.60m (2 feet) or more. The depth of the defensive (curtain wall) line was at most 1.52m (5 feet), with de Gomme again noting the effect of geology on the shallow nature of the ditch.

The ditches around the fortifications (redoubts) were between 2.43m (8 feet) and 2.74m (9 feet) deep. Comparing this information to the size of a ditch suggested by Norwood (1639, 112) of "140. foote broad" (42.67m), it can be suggested that the ditches of the fortifications were totally inadequate for the task.

De Gomme suggests that the southern defensive line was stronger than the row of fortifications, which were enhanced by making use of the River Avon. This illustrates an understanding of using natural topography and features for strategic and tactical advantages. The entire defensive circuit was described as five miles in length. This figure is no doubt exaggerated, as Russell (2003, 10) notes that it would have been just over three miles in length. The Royalists decided to storm the city because an approach would have been more difficult,

especially considering the local geology and the lack of ability to sap or conduct mining operations.

Bristol Castle was described as large, old and weak but was refortified, along with some repairs. A redoubt was constructed nearby, as noted by Samuel Fawcett's survey (below), next to the river. This illustrates the Parliamentarians' strategic awareness of the need to fortify the vicinity near a key supply and communication route, in this case the river. A cut for a moat was begun, probably re-using any surviving cut from the medieval period, which was flooded in some areas. No additional defences were constructed, although it is interesting to note that for construction of the moat, houses were destroyed, illustrating the impact of Civil War fortifications on the landscape of the city of Bristol. Interestingly, Speed's map illustrates a castle surrounded by a wet moat, suggesting that it did once have that defensive capability; perhaps its decline meant that this one aspect could no longer be maintained.

Finally, it is important to understand when analysing de Gomme's writing how much weight can be given to him as a source. In this example, he was describing the Parliamentary defences and therefore might have enhanced/exaggerated the fortifications constructed for the audience he was writing for. An example of this is clearly demonstrated in de Gomme's description of the circuit of defences as five miles in length, when it was just over three (Russell 2003, 10).

#### **5.4.3 The Artillery of Bristol in 1643**

An important, and indeed unrivalled, source is Samuel Fawcett's list of the artillery pieces and their positions in Bristol. Peachy (1993, 28) refers to two lists of ordinance but does not specify where each list comes from. The first list appears to be Samuel Fawcett's, which was made on 28<sup>th</sup> July 1643 by the Royalists after the capture of Bristol (Roy 1975, 261–263). The second list could be from the Rawlinson Collection (D. 395, ff. 138–139), which is referenced by Roy (1975, 263), who confirms that the first list (below) is endorsed by the Rawlinson Collection. The source has been examined by Israel (2008, 27). The list comprises the following (Roy 1975, 261–263):

*“At Gibb tayler in the marsh – 3 Minions, 1 Rabonett*

*In the marsh next the key – 1 Minion*

*At the Topp of the key – 1 Minion*

*Within ffroome Gate – 2 Sakers*

*Vpon the Redoubt by the Limekill neare Clifton – 2 Minions*

*Vpon Brandon Hill Redoubt – 3 Minions, 1 Rabonett*  
*Vpon Windmill Hill Redoubt – 2 Sakers, 1 Minion*  
*Vpon the platform by Mile Hill gate – 1 Minion, 1 falcon*  
*In the Redoubt between Mr. Jones house & prior hill – 1 Minion, 1 falcon*  
*Vpon the Redoubt one prior Hill – 3 Sakers, 1 Murderers*  
*Vpon the platform in the Norneworke at Harrillgate – 1 Minion*  
*On the Spurr by Newfoundland House – 1 Saker*  
*Vpon the platform at Lappers gate – 1 Minion*  
*At newgate over the gate – 1 falcon*  
*Within Newgate – 1 demi Cully, 2 falconets, 4 Rabonetts*  
*In broad mead – 1 Minion, 1 falcon*  
*Before Prince Ruperts Lodgin – 1 Rabonett*  
*Over the Bridge*  
*At Tower Harris over the bridge – 1 Saker, 2 Minions*  
*In the Square Tower next to tower Harris – 2 falconets*  
*In the Round Tower next Temple gate – 1 Minion*  
*Vpon Temple gate – 1 Saker*  
*Platform without Temple gate – 1 Saker, 1 Minion, 1 falcon*  
*In the Spurr next the Gate – 1 Rabonett*  
*In the next Angle – 1 falconet*  
*Vpon the platform behind Ratcliff Church – 1 Saker*  
*In the next Angle to bedmester Gate – 1 falconet*  
*In the Hornworke at Bedmester gate – 1 Saker, 1 Minion, 1 Rabonett*  
*In the demibastion by Trayne mills – 1 Minion, 3 Rabonetts*  
*Vpon Ratcliff Church – 1 Saker, 2 Minions*  
*Within Ratcliff gate – 1 demi Cully*  
*In the Castle*  
*In the Castle walls by the drabridge neare ye gate – 3 Murderers*  
*At the Angle vpon the Right hand on the wall – 1 Minion*  
*In the Halfe moone below the Castle – 2 Minions*  
*Vpon the platform in the Angle of the wall – 1 Minion*  
*Vpon the wall behind the Armorey – 2 Minions, 1 Rabonett*  
*Vpon the wall in the Courtayne – 1 Minion*  
*Vpon the wall ouer the Coffe – 1 Minion*

*In the yard two falconets of Brasse mounted and three Iron vnmounted and one new minion of Brasse vnmounted together w<sup>th</sup>. fouer Rabonetts mounted & two vnmounted – 1 minion, 5 falconets and 6 rabonetts*

*Within the Castle gate one six pound of brasse – 1 Saker*

*Vpon the Castle Tower – 2 deim Cully, 4 Sakers*

*Vpon the greene one whole Cannon mortar-peece brasse – 1 Morter peece”.*

#### **5.4.4 Analysis of the Artillery of Bristol in 1643**

In total, the four demi-culverins, 19 sakers, 33 minions, seven falcons, 11 falconets, 19 robinets, four murderers and one mortar meant that Parliamentary Bristol had 98 pieces of artillery. Peachey (1993, 29) states that combining the two accounts gives 98–99 guns, excluding hammered iron weapons. Analysing positional locations, the marsh is now Queen Square and the redoubt near the limekiln is the Water Fort. The bridge is the old Bristol Bridge (Roy 1975, 483).

The above list demonstrates the locations of artillery positioned throughout the city and the siting of fortifications constructed by the Parliamentarians from 1642 to the start of the 1643 siege. It illustrates 41 separate positions, of which 11 covered the castle. The castle had 43 pieces of artillery, excluding the two unmounted robinet cannons, taking the total to 45. This means that nearly half of the artillery pieces positioned around the city focused on one medieval, albeit reinforced, structure. This suggests that the Parliamentarians felt that it was necessary to hold the structure, as it was defended by a significant piece: the mortar.

#### **5.4.5 Bernard de Gomme’s 1645 Account of the Defences**

Two years later, in 1645, Engineer General de Gomme and John Mansfield (a fellow engineer) described the status of the Royalists’ defences of the city as follows:

*“The Line generally was three foot thicke. The height of it five foot where it was highest. The graffe commonly six foot broad, and where it was widest but seven. The depth in most parts foure foot, and five where deepest.*

*Between Pryor-hill-Fort, Stokes Croft-gate, and beyond the little River towards Laffords-gate, in which places the Enemy entered, not five foot high. The graffe five foot broad, and all that part of the line much decayed.*

*The ditch of the great Fort on the right hand the gate before the face of the Bulwork, was not foure foot deep, and eighteen foot broad, so that horses did go up and down into it. The highest work of the Fort was not twelve foot high, and the curtens but ten.*

*Within one hundred foot of the Fort, there was a deepe hollow way, where the enemy might lodge what numbers bee pleased, and might be in the graffe the first night, and in that part the Fort was minable.*

*Brandon-hill Fort, was about twelve foot about the levell of the great Fort and that being not able to make any long resistance, the Enemy gaining it, would command the other.*

*The Hedges and Ditches without the Line were neither ther cut, nor levelled, so that they lodged their men securely near our workes, at their first approach” (De Gomme 1645, 9–10).*

#### **5.4.6 Analysis of de Gomme’s 1645 Account**

De Gomme notes that the defensive curtain line was mostly 0.91 m (3 feet) thick and at most 1.52m (5 feet) in height. The ditch was mostly 1.82m (6 feet) in width, 2.13m (7 feet) at best, and 1.21m (4 feet) in depth, occasionally 1.52m (5 feet). The width of the ditch, although not part of a single fortification and covering five miles, appears to have been insufficient to stop a cavalry assault or approach by soldiers.

The defensive area between Prior’s Hill Fort, Stokes Croft Gate, the “little River” (presumably the River Frome) and Lawford’s Gate had a defensive line at most 1.52m (5 feet) in height, with the same distance for the width of the ditch. There is no mention of any additional defensive features, such as storm poles, to stop an assault; however, de Gomme himself notes that the area had received little attention and appeared to be in a worse state than in 1643.

When describing the section of the Royal Fort (“great Fort”) to the right of the gatehouse before the bastion face (the area of the rampart and the adjoining flank), the measurements are given as “not” four feet (1.21m) in depth and 18 feet (5.48m) in width. This implies that he felt that there should have been a minimum recommended depth and width, suggesting that the fortification was not finished to sufficient standards and possibly not finished at all. It also highlights a difference between the manuals of the period (e.g. Norwood 1639, 112; Ward 1639, 60) and actual construction, as illustrated when analysing de Gomme’s comments on the state of the 1643 defences. When examining the height of a fortification, it should be remembered that someone facing the feature at the opposite end of the ditch would



see the combination of the depth of the ditch and the height of the rampart, making the actual structure appear larger and more formidable.

When describing the height of the fortification, de Gomme notes that it was not 12 feet (3.65m) in height, with the curtain but 10 feet (3.04m). This information appears to be at odds with the literature of the period, with both Ward (1639, 61) and Papillon (1645, 17) suggesting that a rampart (curtain) should be 30 feet (9.14m) in height – a significant difference of 20 feet (6.09m). The feature of approximately 12 feet (3.65m) in height might have been a bastion, therefore suggesting that a bastion should be larger than a rampart; indeed, this would appear to be logical, as the bastion houses the artillery (the main weapons of the fortification), and additional height could provide the cannons with greater elevation to obtain a tactical advantage. Conversely, both the ramparts and the bastions might have been constructed smaller than the literature suggests, as all the plans of the Royal Fort indicate a five-sided fortification (see below), which would have required a total of ten bastion faces to be constructed, in addition to the five ramparts. This suggests that it was more important to hold the high ground and sacrifice some of the construction and design elements in order to gain a strategic advantage but forgo a significant tactical advantage when facing the enemy's approach.

De Gomme notes the tactical weakness of a hollow way within 100 feet (30.48m) where enemy soldiers could hold position and take part of a ditch in a night raid where the fortification was insufficient. As in an earlier comment, this suggests that de Gomme felt that the fortification was not ready to face an assault and not built to his standards; although he oversaw the build, issues such as lack of men and resources could have affected the Royal Fort's construction. It also suggests that de Gomme understood how the landscape could affect fortifications and that no attempt had been made to minimise the impact of the hollow way.

It is also noted that Brandon Hill Fort was positioned higher in the landscape, as noted in his 1643 analysis of the city's defences, as it was approximately 12 feet (3.65m) higher in the landscape than the Royal Fort; capturing the former would mean that the latter would succumb relatively soon afterwards. As de Gomme notes, Brandon Hill Fort would not hold out for a significant length of time, and it can be inferred that this fortification was not of sufficient standard as well.

Finally, de Gomme states that the hedges and ditches not connected to the defensive line were not maintained, noting this tactical disadvantage to the defending Royalists. This illustrates a lack of preparation, as failing to clear the hedges would have meant that a clear field of fire could not have been established.

It is important to note that de Gomme was probably writing the description of the defences in 1645 in support of Prince Rupert, who was in command when the Royalists lost control of the city to Parliament. Therefore, it is necessary to stress how much weight can be given to de Gomme as a source; for example, when writing for Parliament, Iremaine (1645, 2) described the Royal Fort as “one of the bravest Citadels in *England*, in it foure and twenty pieces mounted upon five Bastions, Powder in quantity, Victuals in abundance of all forts, fourscore or an hundred tunne of Bread sufficient to serve almost one hundred thousand men a day”.

### 5.5 Cartographic Analysis of Bristol

Speed’s map (**Figure 22**) of Bristol shows a city divided in two by the River Avon and with the northern section intertwining it and the River Frome. The northern area of the city has sprawled out past Frome Gate to the north and the north-east, meaning that a small section of the medieval wall survives, encircling the old city from the north to the east to Bristol Castle, which is depicted as a commanding fortress surrounded by a wet moat. The map does not clearly demonstrate the surrounding hills around the northern area of Bristol, although raised land around the city is represented. Expansion to the west appears to have been halted at an area of marshland near the River Avon.

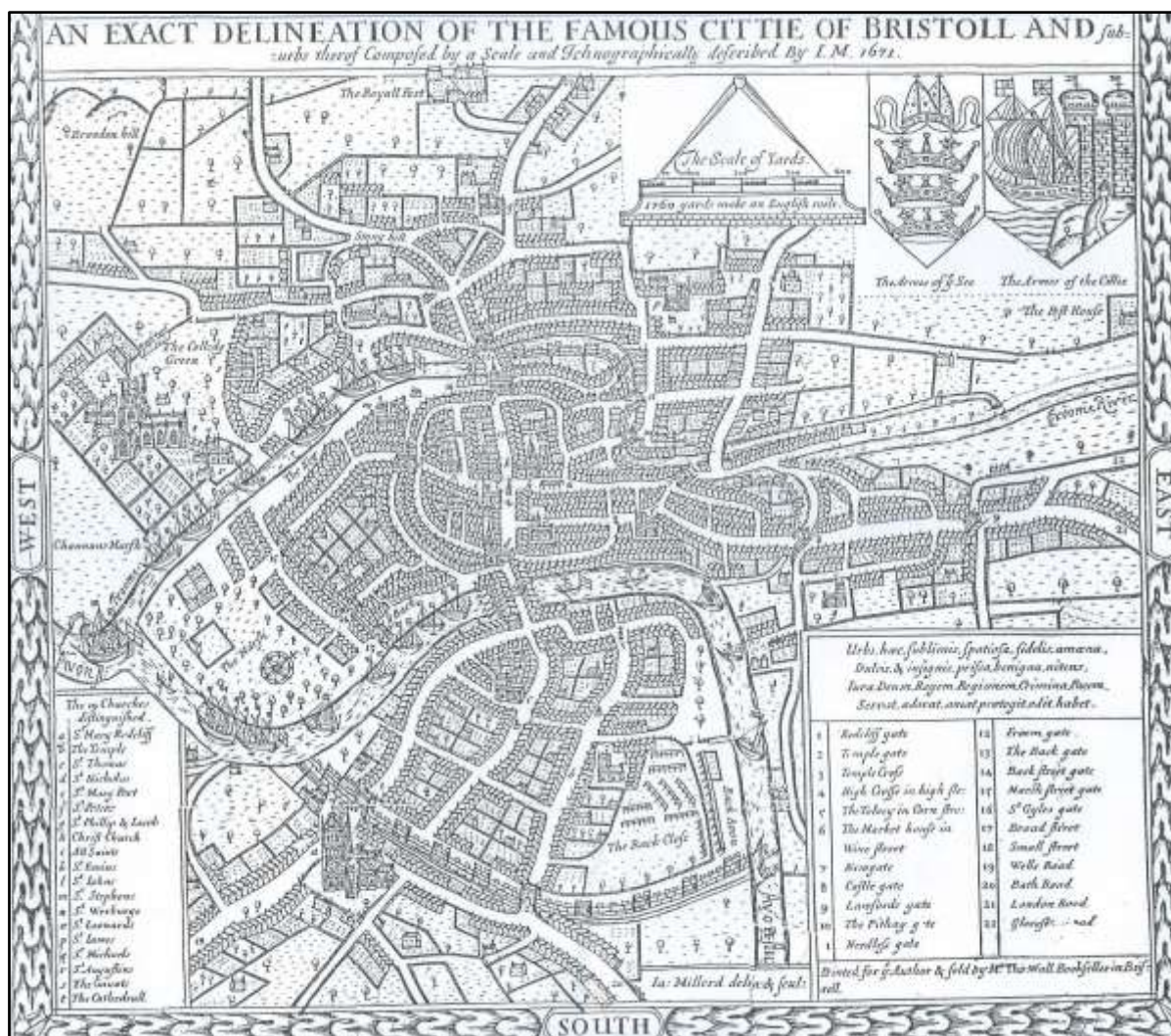
To the south, the city is enclosed within the medieval Portwall, with small ranks of houses expanding outside two medieval gates along the roads approaching Bristol from the south. The expansion south-west outside the city is dominated by St Mary Redcliffe Church.

No contemporary plan of the fortifications dating to the Civil War exists. The earliest post- Civil War plan is Millerd’s (1671), which illustrates the rapid removal from the cityscape of the Civil War fortifications (**Figure 23**). There is no evidence of the Water Fort. Brandon Hill is represented, but not the fortifications sat upon it. The Royal Fort has been transformed into a series of residential homes, and there is no evidence for the survival of Colston’s Fort and Prior’s Hill Fort. There is also no evidence of a ditch encompassing the city, suggesting that it has been filled in or is no longer a significant feature in the cityscape.

The plan does show the continuation of the medieval Portwall encompassing the southern part of the city. Overall, the plan shows a small, tightly cramped city, with the River Avon dominating the southern section. The surrounding landscape is depicted as agricultural land with some trees and land division, probably hedges, demonstrating the continuation of the medieval distribution of the hinterland of Bristol. Bishop (2016, 36) notes that “Every house





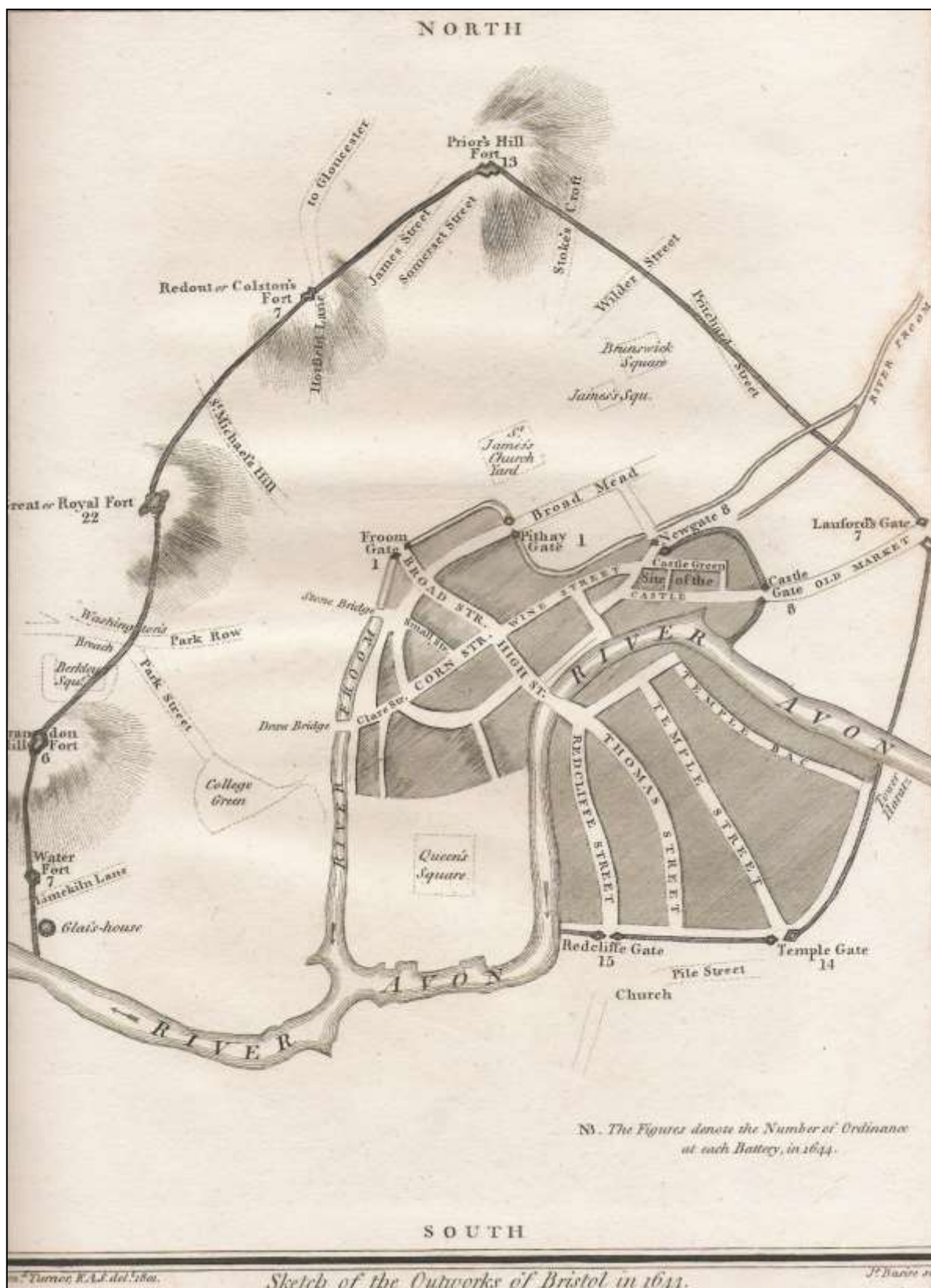


The plan demonstrates that the fortifications of Brandon Hill Fort, the Royal Fort, Colston's Fort and Prior's Hill Fort were placed on a small plateau at the summit of hills surrounding the north-west landscape of Bristol. The sketch clearly demonstrates that Turnor felt that it was important to illustrate the dominating hills around the west and north of the city. McGrath (1981, 49–50) notes that Turnor made an error depicting a stone bridge and drawbridge over the River Frome. Ross (1887) continues this mistake of Turnor.

Ross's 1887 plan demonstrates the high landscape surrounding the city to the north and the locations of the fortifications and defensive line (**Figure 25**). The plan provides an appreciation of why the fortifications were constructed on the hills overlooking the city. For example, it demonstrates why Colston's Fort was placed at its location, as it covers a road entering and exiting the city.

Both Turnor's and Ross's plans demonstrate that the fortifications constructed had little impact on the cityscape of Bristol but did affect the surrounding landscape. This shows that the placement of the fortifications was influenced by the surrounding high ground.

To the south, both plans omit certain fortifications, including those "Over the Bridge" referenced by Samuel Fawcett's survey of 28<sup>th</sup> July 1643, specifically the platform near Temple Gate, the spur next to the gate, the next angle, the platform behind St Mary Redcliffe Church, the angle near Bedminster Gate, the hornwork at Bedminster Gate and the demi-bastion at Trin Mills. Redcliff Church (presumably St Mary Redcliffe Church) is only mentioned in Turnor's plan. The historical evidence of a hornwork demonstrates a wider sphere of influence, with a possibly similar design to that seen in **Figure 4**. It is interesting to note that the French favoured the use of hornworks (Duffy 1979, 92), suggesting different schools of thought merging together.



**Figure 24: Map of Bristol in 1644 (Turnor 1802, plate XXXV facing page 130)**



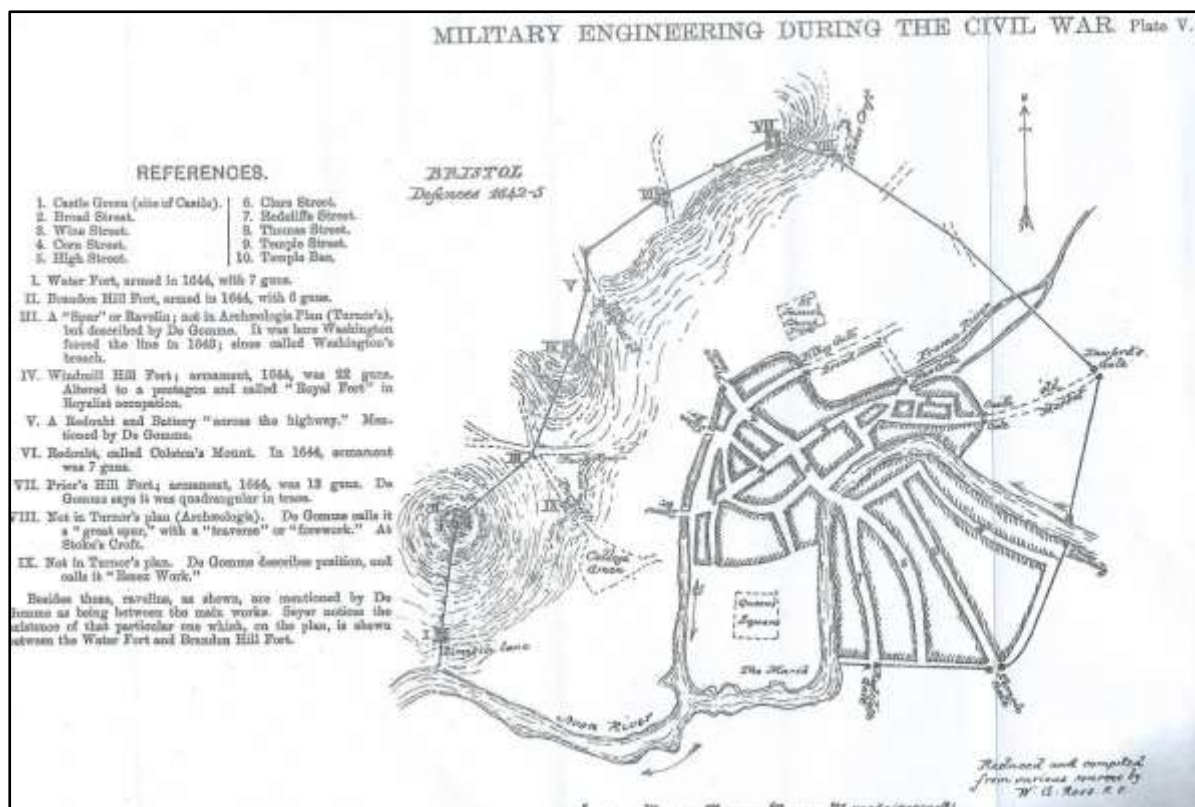


Figure 25: The defences of Bristol between 1642 and 1645 (Ross 1887, Plate 5)

The most recent map (**Figure 26**) is a map of the locations of the fortifications constructed between 1643 and 1645 in Bristol as a result of the English Civil War. It demonstrates the locations of the key fortifications built in the surrounding landscape, particularly the Water Fort, Brandon Hill Fort, Windmill Hill Fort (later the Royal Fort), Colston's Fort and Prior's Hill Fort. In addition, it notes the works at Stokes Croft, Lawford's Gate, Gloucester Lane, Tower Harratz and the Portwall. The map also demonstrates the defensive line east and south of St Mary Redcliffe Church, of which the only evidence is based on historical documentation from Samuel Fawcett's survey of 28<sup>th</sup> July 1643.

Overall analysis of the city plans suggests a confident picture of where and when many of the fortifications were sited during the Civil War. This means that when examining the reasons behind their siting, the question regarding the general positions of the fortifications is not an issue requiring debate.

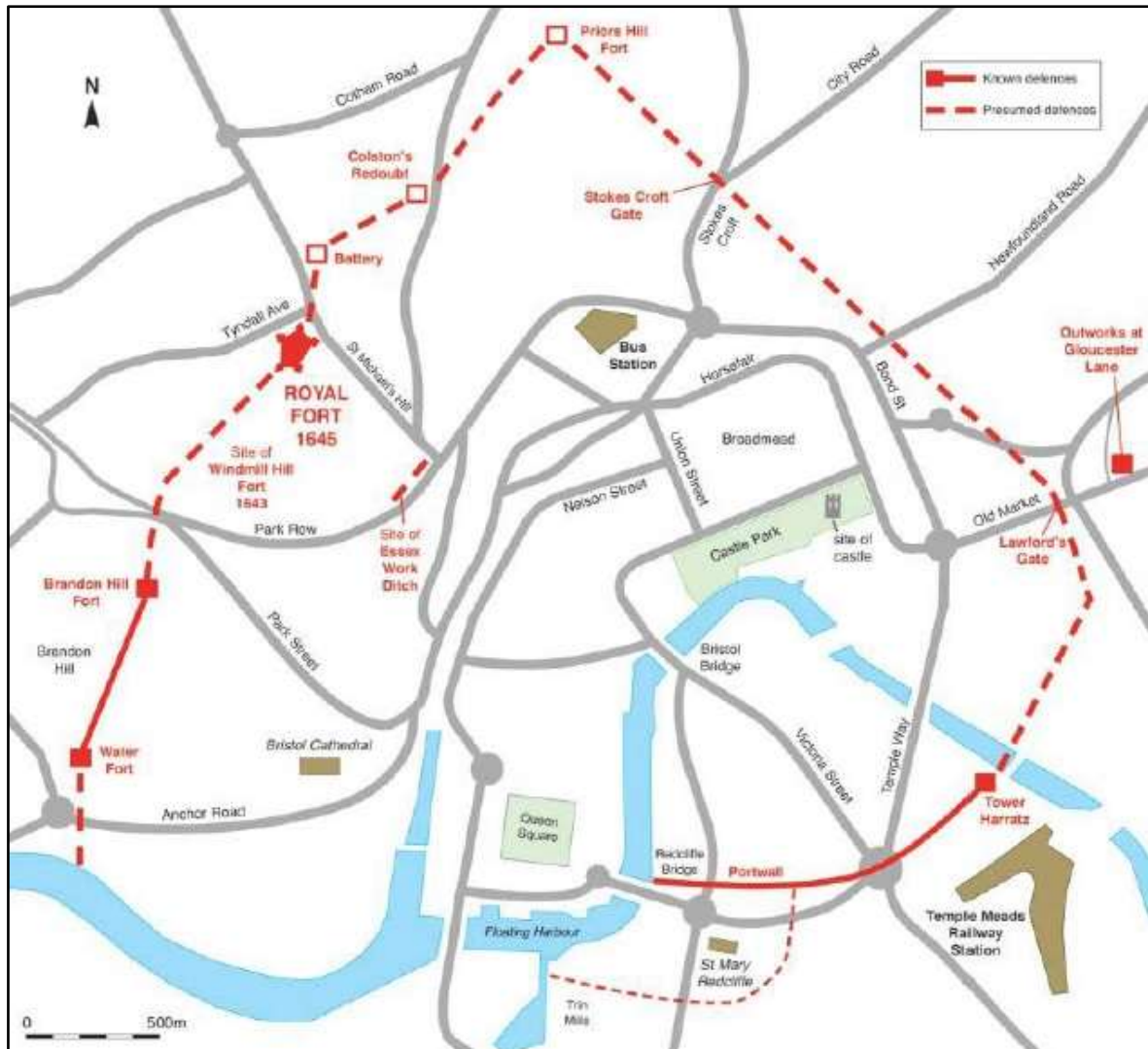


Figure 26: The location of the fortifications of Bristol in 1643 and 1645 (King 2012, figure 3, page 5)

### 5.5.1 Fortification Plans

No contemporary plans of any of the fortifications are known to exist. The earliest plan of a fortification is of the Royal Fort (**Figure 27**) from the mathematician Staynred, dated 1669.

As the figure's caption notes, the fortification is of irregular design. It is five-sided with five bastions. The angles of the flanks appear to correlate to right angles from the rampart walls. The mathematical precision is very similar to the manuals of the period, for example that of Norwood (1639) (Israel 2008, 46).



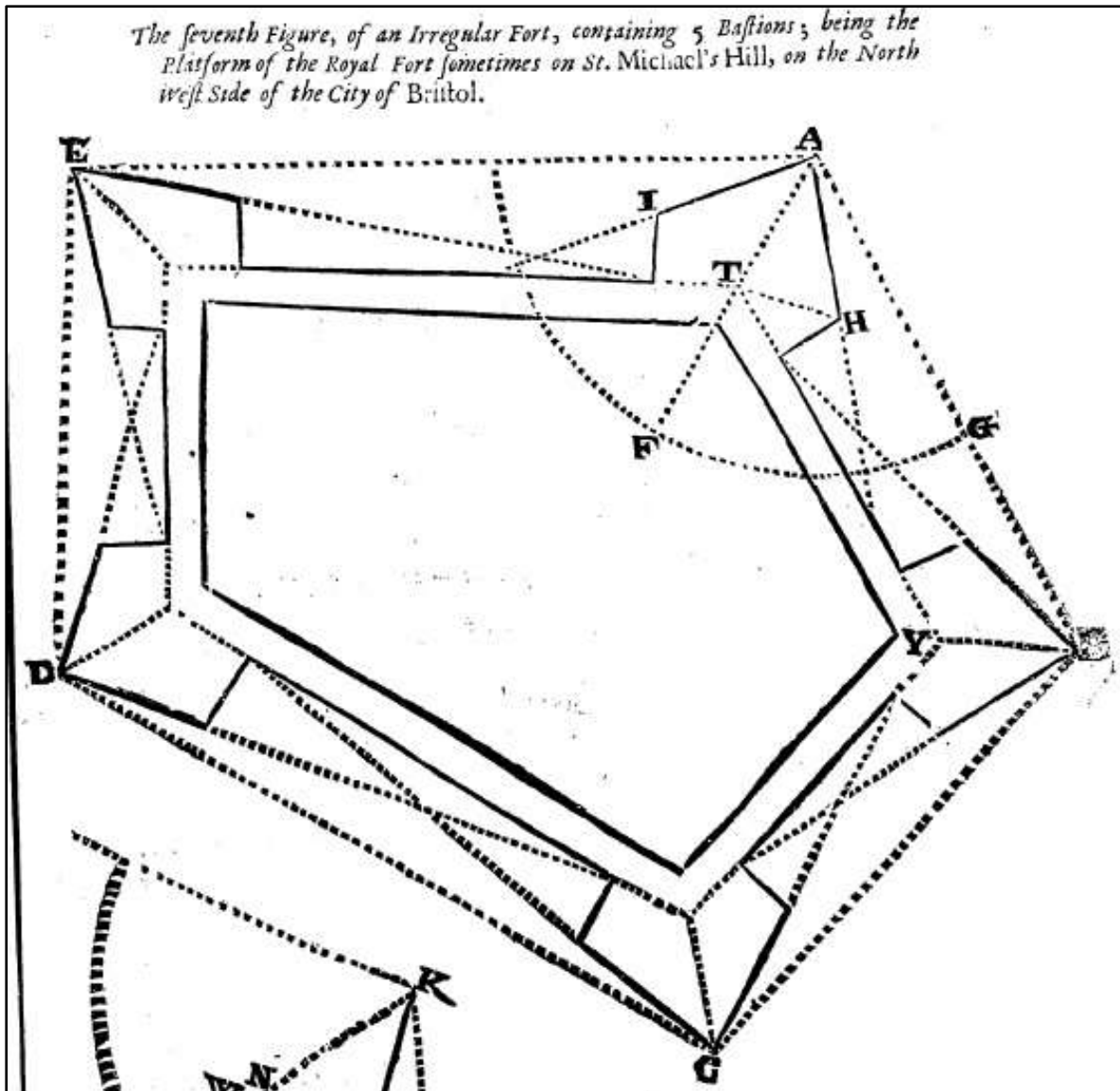


Figure 27: The earliest dated plan of the Royal Fort (Staynred 1669, 9) (image from different source utilised in Israel 2008, 46)

In 1673, Millerd published another plan of the fortification (**Figure 28**). Like Staynred's, the plan shows a fortification containing five bastions.

The angles of the flanks to the bastions are set at approximately  $90^\circ$ . This illustrates an adoption of contemporary manuals, such as that of Norwood (1639), and the Dutch system of construction. This is the first plan to demonstrate the Royal Fort gatehouse, of which part of the structure may survive in the current landscape.

A further plan of the Royal Fort was produced by Seyer in 1823 (**Figure 29**). The plan illustrates a fortification containing five bastions, like the plans of Staynred and Millerd. The flanks are all at, or extremely close to,  $90^\circ$  angles to the ramparts. This suggests minor changes

from the earliest designs and does follow the ideas set out in the manuals of the period, specifically that of Norwood (1639).

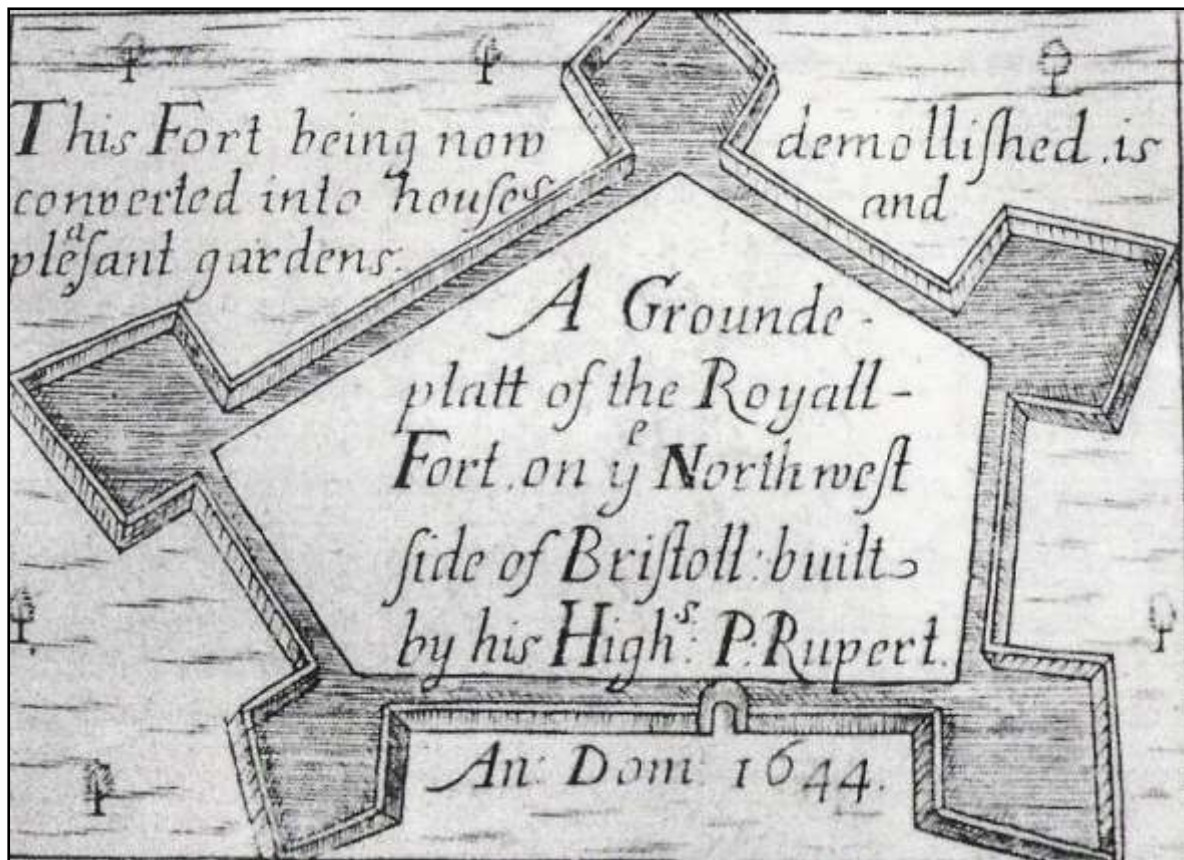


Figure 28: Jacob Millerd's 1673 plan of the Royal Fort (Saunders 2004, 59, as cited in Israel 2008, 30)

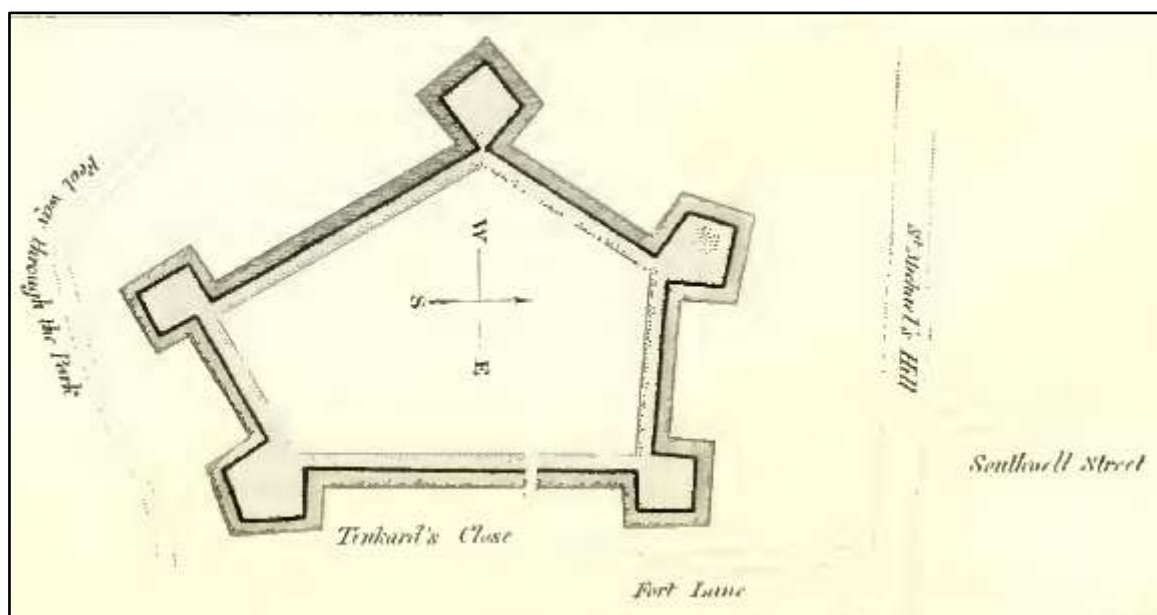


Figure 29: Samuel Seyer's 1823 plan of the Royal Fort (Seyer 1823) (image from different source utilised in Israel 2008, 47)

Skelton's (1825) plan of the Royal Fort (**Figure 30**) does illustrate some differences from the plans of Seyer and Millerd. Whilst it shows a five-sided bastion fortification, the flank angles at the south-west, south-east and north-east are a combination of acute and obtuse. This suggests that perhaps Skelton was working from a different, unknown source from that of Millerd and Seyer. The plan demonstrates a circular feature near the centre of the fort, probably the Royal Fort well.

Overall, each plan also gives different dimensions to the lengths of the ramparts, making a definitive assessment of the size of the fortification via cartographic analysis very difficult.

Further plans produced in the 20<sup>th</sup> century by Parker (1929, Plate 3), King (2003a) (**Figure 31**) and Townsend (2007), as discussed by Israel (2008), show a fortification containing five bastions, albeit with the north-western bastion demonstrating some interesting angles, before the results of King's excavations.

The potential survival of parts of the Royal Fort fortification into the 1740s, albeit as part of houses and gardens, as noted by Jacob Millerd on his 1673 plan, explains the approximate location of the fortification in the landscape.

In the late 18<sup>th</sup> century, Humphrey Repton (Israel 2008, 41) conducted landscaping of the site and had a quarry in c. 1792 near the location of the south-west bastion of the Royal Fort. In 2014, excavations of two 3m x 1m test pits were conducted by the author. The excavations were small in depth and recorded evidence of turf and top soil of a moderate brown loose friable nature and redeposited geology, but no finds. This evidence suggests that the landscape was sterilised during the creation of landscape gardens by Humphrey Repton in the late 18<sup>th</sup> / early 19<sup>th</sup> centuries and subsequent works (Israel 2017, 6).

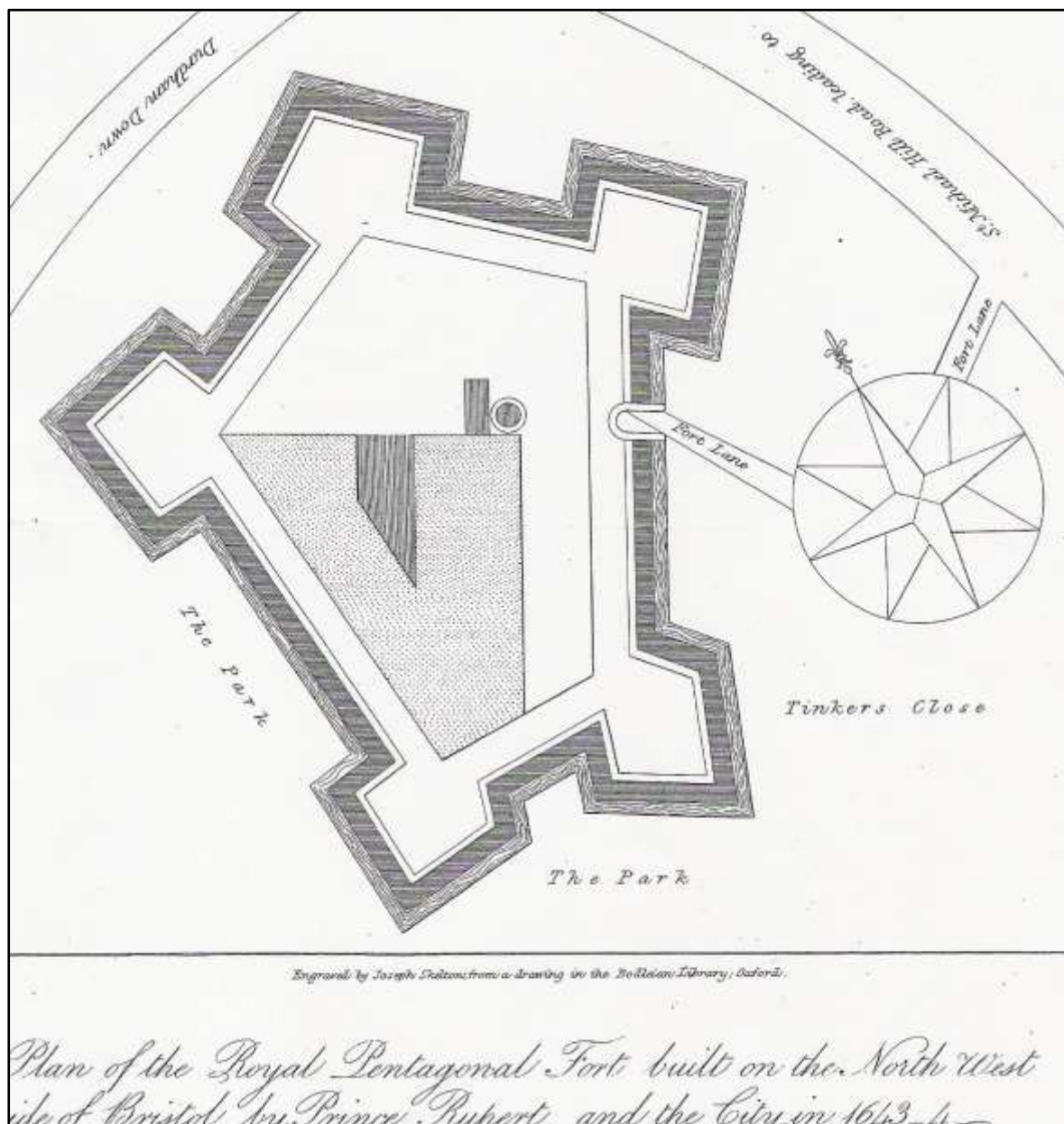


Figure 30: Skelton's plan of the Royal Fort (Bristol Reference Library, as cited in Israel 2008, 48)

A plan of a south section of Bristol Castle shows the fortification as a strong fort bristling with artillery pieces along the curtain wall and tower keep (**Figure 32**). The impression the plan gives is a fortification in excellent condition that would have been a formidable structure to successfully assault.



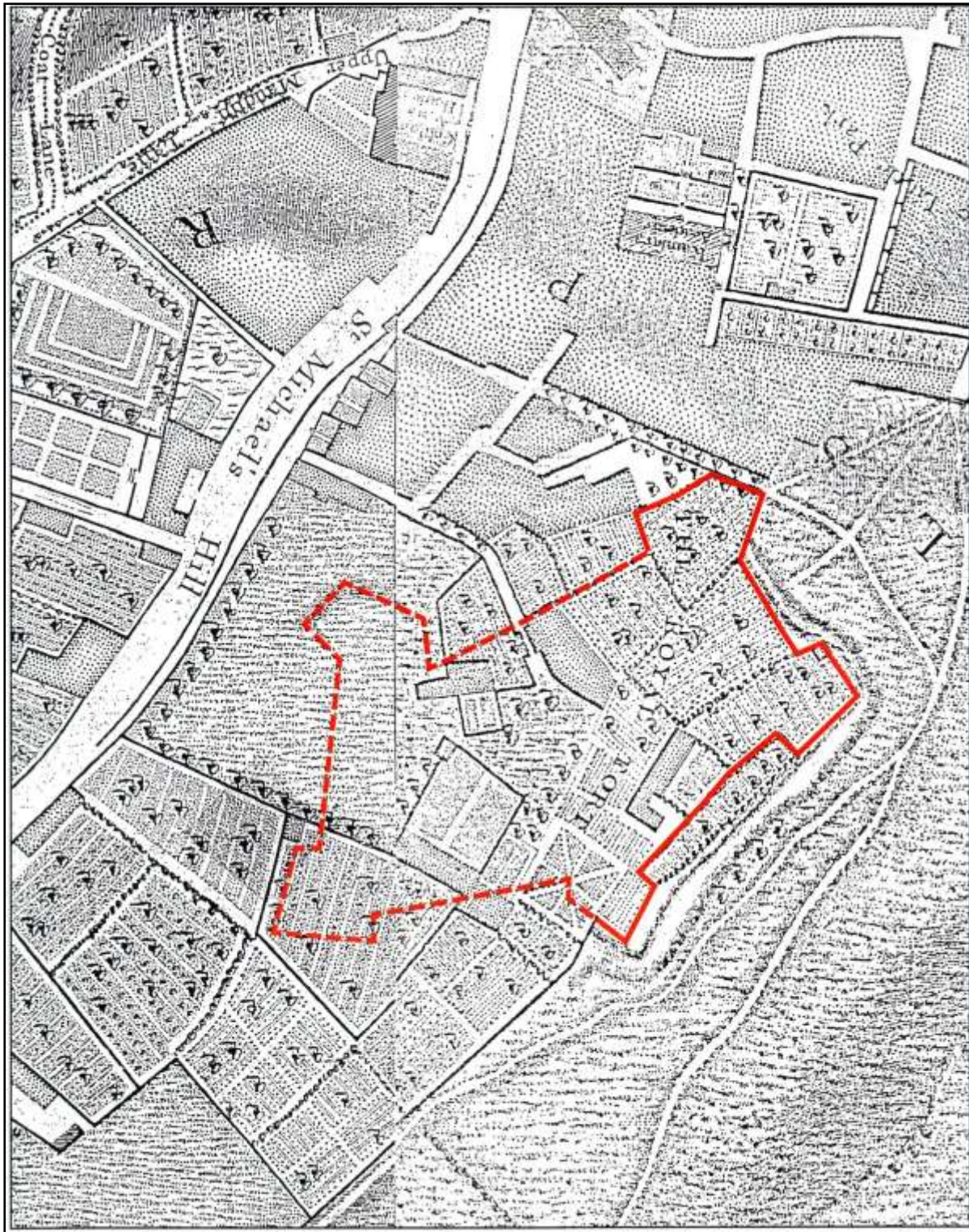


Figure 31: Remains of the revetted fort in Rocque's 1742 landscape (King 2003a, as cited in Israel 2008, 50)

Another plan of the Royal Fort (**Figure 32**) shows a fortification with five bastions and a gatehouse. The plan does not demonstrate any usual or significant features that are not displayed in any other plans of the fortification.



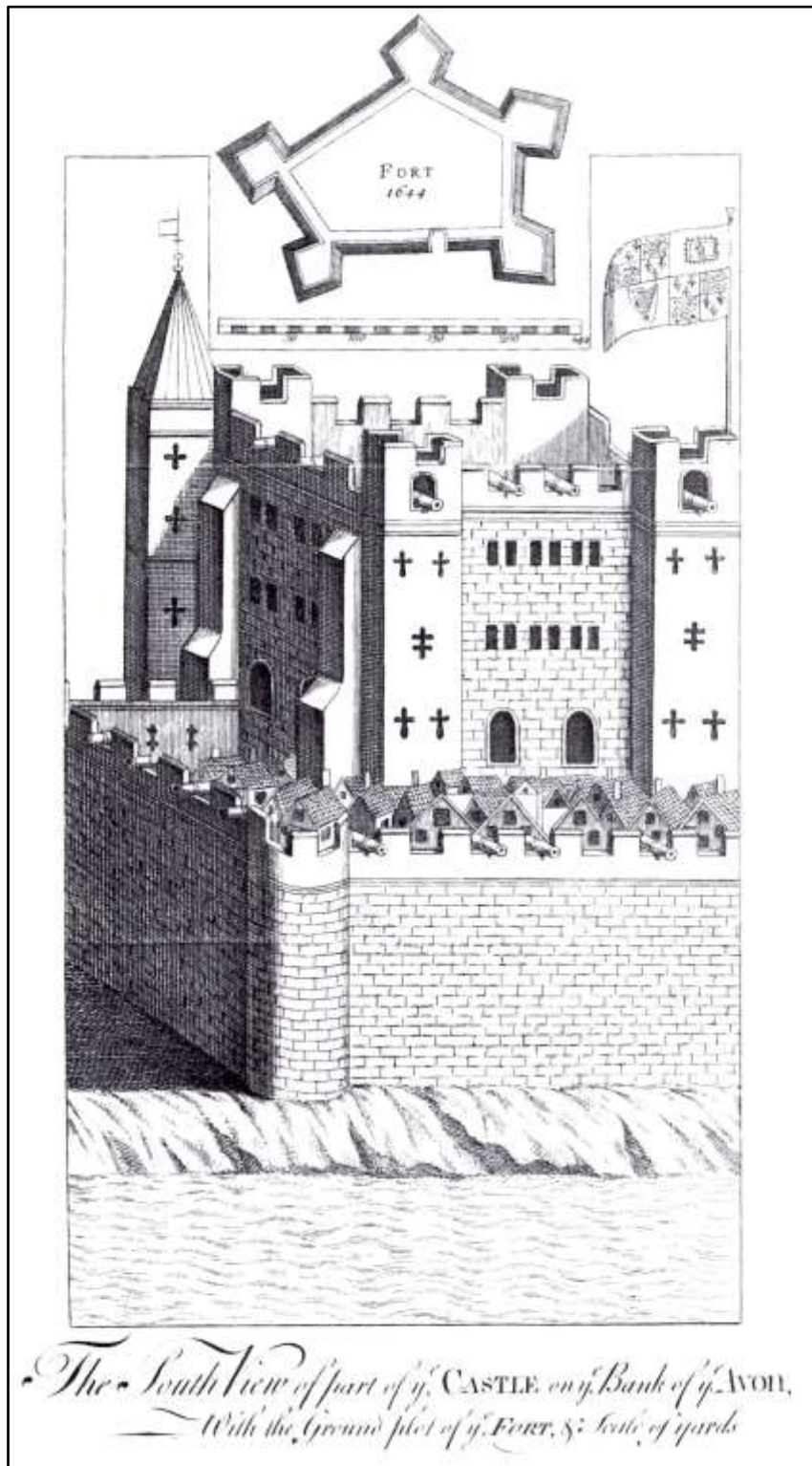


Figure 32: A plan of the Royal Fort and Bristol Castle (Barratt 1789, between pages 200-201)

### 5.5.2 1:10,560 First-Edition Ordnance Survey Map

Analysis of this source does not illustrate any surviving features for the Water Fort. It does, however, depict a rampart, flank, bastion wall and ditch for Brandon Hill Fort, but there is no

evidence of a spur. No evidence (or site of) of Essex Fort is noted. Possible evidence of the northern bastion of the Royal Fort is illustrated, now taking the form of a wall/field boundary, indicating land division (**Figure 33**); indeed, this represents the same wall noted by Leech (2000, Figures 7 and 10, 6) as being extant in 1884. Whilst the site of the gatehouse is present, it is not referenced as such. No evidence of Colston's Fort is depicted, neither is any evidence of Prior's Hill Fort, the work at Stokes Croft, the ditch at Gloucester Lane or Lawford's Gate. The map does not reveal evidence of Bristol Castle. Evidence for Tower Harratz and the Watergate is also missing. The site of the Trin Mills demi-bastion was transformed into a general hospital. In addition, there is also no evidence for the 1643 and 1645 siege batteries and the 1645 Parliamentary siege battery and headquarters.

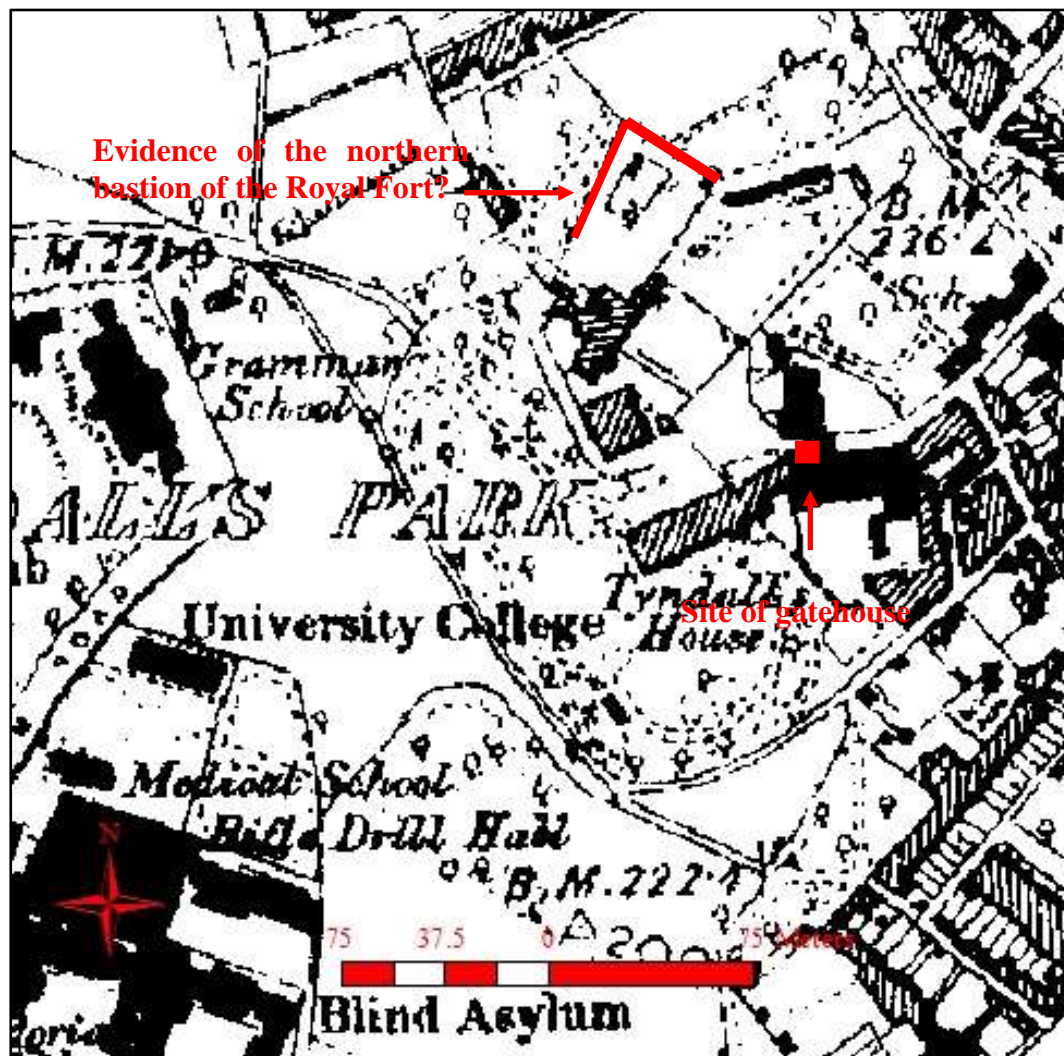


Figure 33: Extract of the 1:10,560 Ordnance Survey Map at scale 1:3000, possibly indicating evidence of the northern Royal Fort bastion (After Historic Digimap © Crown Copyright and Landmark Information Group Limited (2016). All rights reserved. (1846-1899))

## 5.6 Archaeological Evidence of the Fortifications of Bristol

### 5.6.1 Brandon Hill Fort

According to Russell (2003, 13, 14), 200 metres to the north of the Water Fort, the ditch of the curtain wall meets a spur: a small artillery platform of triangular shape. These features would have been constructed in 1643 by the Parliamentarians. To the west of the spur, there is extant evidence of an outwork of bastion shape, probably constructed by the Royalists in 1644. It is suggested that the outwork was faced with a stone revetment of nearly 1m thick of geology (Quartzitic Sandstone Formation), which was bonded together in white mortar containing black flecks. A small stone revetment (curtain wall) survives farther north. After a gap of 50m, the wall reappears, rising to 2.5m in height and adjacent to a ditch, which is 1.1m in depth and 5.5m in width. The wall ends at a height of 3m at a bastion made of stone with an internal platform of 3.5m in width, surrounded by a ditch. The bastion is connected to Brandon Hill Fort.

In 2011, excavations were conducted upon Brandon Hill. Whilst the size of the ditch was similar to the one excavated on Gloucester Lane in 2002, no finds dating to the Civil War were recovered (King 2011, summary). The ‘bastion’ wall appears very similar to the wall found in the Royal Fort Gardens, presumed by many to be a surviving part of that Civil War fortification. The current bastion is a replica (King 2011, 10–11): a perceived notion of what a Civil War bastion should/would have looked like if made of stone.

It is possible to theorise that the bastion described by Seyer might have dated to the Civil War. However, King (2011, 11) suggests that the original fortification was modified in the mid-18<sup>th</sup> century. If this theory is correct, it means that Seyer (**Figure 34**) would have almost certainly been observing the folly when his memoirs were published in 1823. It is because of this evidence that the plan was not analysed in Section 5.5.1 Fortification Plans. Seyer’s plan shows what appears to be a ditch system heading north–south towards the Water Fort. It connects to a semi-circular spur feature, denoted as a bastion, towards a circular feature known as ‘the Mount’. To the south of the bastion feature appears to be an earthen bank system heading east–west, with a gap described as unfinished. After the break and a small curvature to the north, the feature continues, again interpreted as moving towards a bastion-like projection curving north-west. Sharply, the feature heads north-east for a short distance before turning again, heading south-east; with a small gap, the line continues in a northerly direction.

The bastion feature appears to have two large flanks with a small bastion face. From the bastion face, it joins the larger flanks at approximately 90°. From a tactical viewpoint, it



appears that cannons would have had to be mounted along the flanks. The design of the fortification (if accurate) appears to contradict the manuals of the period.

In 2015, as part of a series of trenches to locate subterranean First World War practice trenches on Brandon Hill (Rowe 2018, forthcoming), potential evidence of a new fortification in the form of a ditch was discovered in Trench 12. The new fortification may form part of a half-moon. A cannon ball was also located. The cannon ball weighed 381 g (0.83lb) and had a diameter of 16cm (Israel 2015).

From Brandon Hill, the ditch and bank system would have turned to the east and left the park through the south-eastern section of Berkeley Square. There is evidence that a spur overlooked the breach (known as ‘Washington’s Breach’) made by the Royalists in the Siege of 1643, which led to the Essex Work.

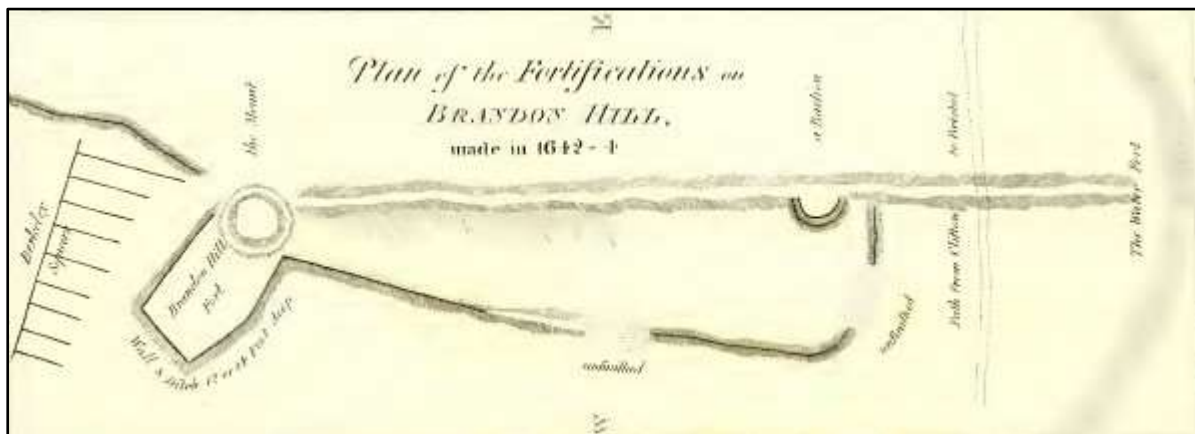


Figure 34: Samuel Seyer's 1823 plan of Brandon Hill (Seyer 1823)

### 5.6.2 The Essex Work (or Essex Fort)

The work lay near the modern-day junction of Park Row and Woodland Road, where excavation revealed a significant ditch in Trench 2 (Bryant 1994, 7–8, 11). The trench was dug by machine to a depth of 2.2m and continued by hand. The northern end revealed a steep ditch at an angle of 40–60°. Deposits of clean sandy clay were immediately in front of the ditch, with tip lines over these. A small depression was observed in the tip lines. The northern edge of the ditch might have been seen in Trench 4. The ditch was at a minimum 50m in length and 7.5–9m in width; the angle of the outer face (counterscarp?) rarely went below 40° (**Figure 35**). Due to its significant size, it was inferred that the ditch was part of the Essex Work, although no dating evidence was recovered. The western section of the ditch turned sharply to the south and became narrower and shallower. This could indicate a bastion corner.

Comparing the size of the ditch to the information in **Table 1**, the feature is smaller in diameter to the recommended width suggested in the manuals of the period, although only by

0.14m. Despite the minor difference, this does suggest planning and an appreciation of the literature available, such as that of Norwood (1639).

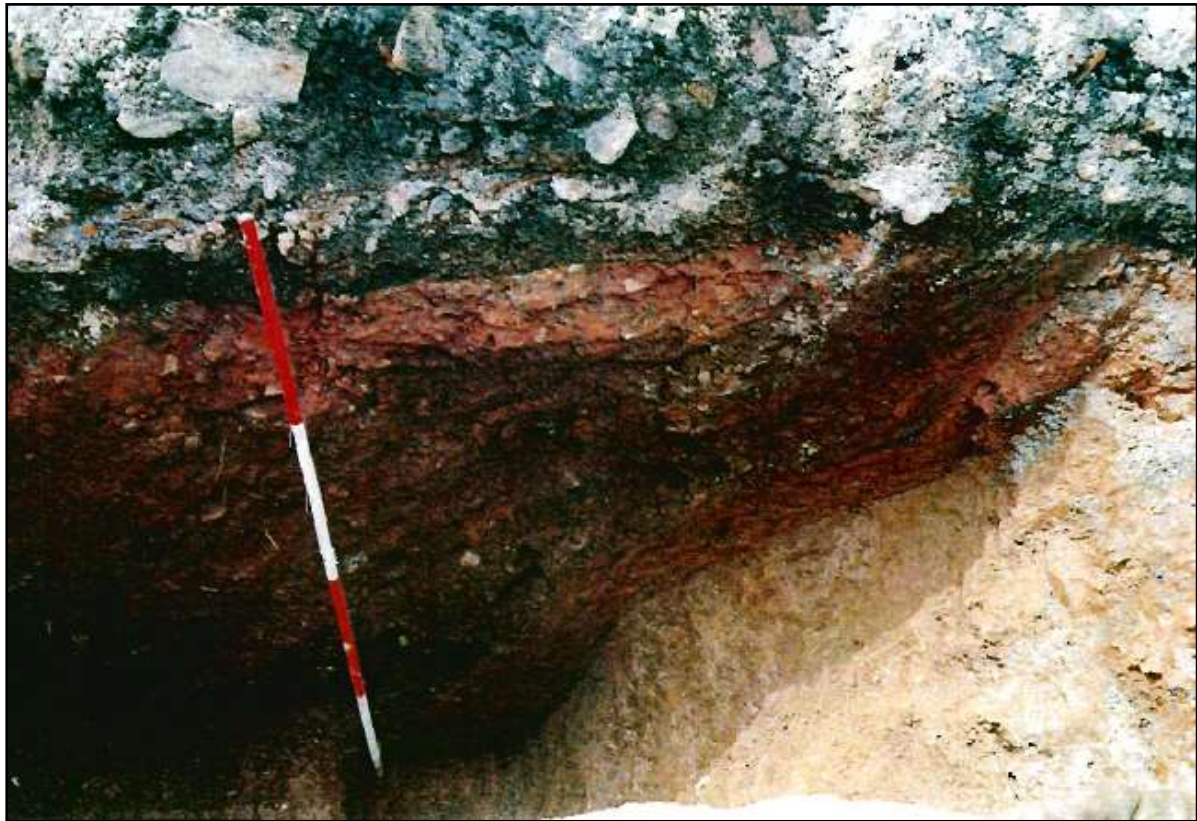


Figure 35: The ditch and fill seen in Trench 2 – part of the Essex Work? (Bryant 1994, Plate 2)

### 5.6.3 Windmill Hill Fort / the Royal Fort

In 2011, excavations revealed significant archaeological evidence. Prior to the Civil War, the site had been utilised as a quarry. No evidence of the Parliamentary Windmill Hill Fort was uncovered. Cut [160] was the eastern ditch of the Royal Fort. The ditch was 50m in length and ran in a north-west to south-east direction. At both ends of the ditch, a flank was present. The northern flank extended 5m beyond the excavation limits. The south-eastern bastion had two flanks: one heading north for 5m and a sharp one heading east for 12m. Due to earlier quarrying, this bastion would have required the surrounding landscape to be ‘made up’, and this was evident with several contexts of clay and a variety of stones, together with buff-coloured mortar. The northern section of the ditch had been cut 1.8m into the natural geology (Brandon Hill grit (hard sandstone)); with an undulating landscape, the ditch was cut to a depth of 2.5m at the southern end in that area until bedrock was reached. The outer section of the ditch followed a gradual curve, rather than being cut to mirror the flanks. This meant that the

ditch was 6–7m in width at the bastions and 11–12m in the centre (**Figure 36**) (King 2012, 1, 6–7). This has been interpreted as evidence of a scarp and counterscarp (King 2014, 17). The ditch was greater in depth than the maximum suggested by contemporary manuals (**Table 1**). This demonstrates an understanding of the key principles of creating a fortification and evidence that the fort was designed by an experienced and reputable engineer, Bernard de Gomme, who employed Dutch design techniques.

The steepness of the ditches varied 35–45° when cut through clay and was near vertical through the geology. The base of the ditch at the southern bastion was 74m aOD, with the bastion at 76.3m aOD; this therefore suggests that the rampart (curtain wall) could have stood 5m in height from the base of the ditch. The ditches would have been infilled from the internal section of the rampart, with no revetment on the northern section. The southern bastion suggests a potential concrete footing that was sealed by clay, mortar and rubble deposits. Considering its quantity and location in a specific area, this may suggest a revetted stone bastion (King 2012, 7–9).

Inside the fortification was a feature called ‘The Long Building’ (465), measuring 26m in length and 6m in width and parallel with the ditch. The building comprised two rooms, with the small one located at the north-west end. The walls were made of rubble, varied 0.55–0.72m in width and were bonded together with buff-coloured lime mortar. Deposit 241 contained seven musket balls. The building might have been a masonry barrack block (King 2012, 8–9) to keep black powder and munitions dry.

An approximately square feature [420] measuring 7.6m in width and 4.3m in depth with stone walls 2m in height was located to the north-west of The Long Building and has been interpreted as a magazine store. The 2m thick walls were made of stone and were bonded together with the same buff-coloured mortar found in The Long Building. No water was located inside the feature (King 2012, 9).

Evidence of a well was discovered, measuring to a depth of at least 5m, with the true depth unable to be established. The feature had a diameter of 3m and was cut into the geology; it was, however, unable to be dated to the Civil War (King 2012, 10). If the well did date to the Civil War, it illustrates another important factor: having a water supply to help to maintain a healthy fighting force.

Context (199) revealed a cannon ball measuring 10.3cm in diameter and weighing 4.2kg. This type of cannon ball would have been used in a demi-culverin (**Figure 37**) (King 2012, 19). As a demi-culverin was not present during Samuel Fawcett’s 1643 survey, it suggests either the importation of artillery (and a signal of the prestige of the fortification under



construction that such a powerful weapon was to defend the Royal Fort) or a vestige of incoming fire during the Siege of 1645.



**Figure 36: Two flanks of the south-eastern bastion in the foreground and the Royalist Civil War ditch (facing north-west) (King 2012, Plate 4)**



Figure 37: The demi-culverin cannon ball (Extract of King 2012, figure 23)

The flank extending for 5m appears to be an actual flank of the bastion system. The flank extending for 12m appears to be the bastion face itself. The flanks appear to be at 90° angles (**Figure 38**), suggesting that the fortification appears to correspond with the manuals of the period. However, the lengths of the flanks and bastions appear to be significantly smaller than the ones suggested by the literature. **Table 1** gives measurements of 85.3m for the length of a bastion and c. 30.48m for the length of a flank on a five-sided polygon. A bastion of 12m in length with a 5m flank is significantly shorter than the manuals of the period recommended. The evidence suggests that whilst the basic flank-to-bastion face angles were followed, other dimensions were not. However, this could have been a result of insufficient men and equipment to construct the fortification.

Interestingly, it would be fascinating to understand de Gomme's mindset of revetting the bastion(s) if the fort was incomplete. Again, why construct a scarp and counterscarp, if the fortification itself was not fully complete? Perhaps this suggests that de Gomme was more concerned with having one section secure, rather than the whole fortification complete. It may indicate an attempt to consolidate the position of the fortification and the northern section.

Comparing the above archaeological information to de Gomme's own account of the state of the Royal Fort in 1645, the evidence does differ. For example, the archaeological evidence suggests that a rampart (curtain wall) could have stood 5m in height from the base of the ditch, whilst de Gomme states that the curtain wall was but 10 feet (3.04m). An explanation may be that de Gomme's account was purely focused on the unfinished areas and that some additional work was completed after he made his survey of the state of the fortification. The evidence may illustrate that de Gomme measured the rampart from a different starting point. Perhaps, considering the state of the fortification in his report, further amendments were made.

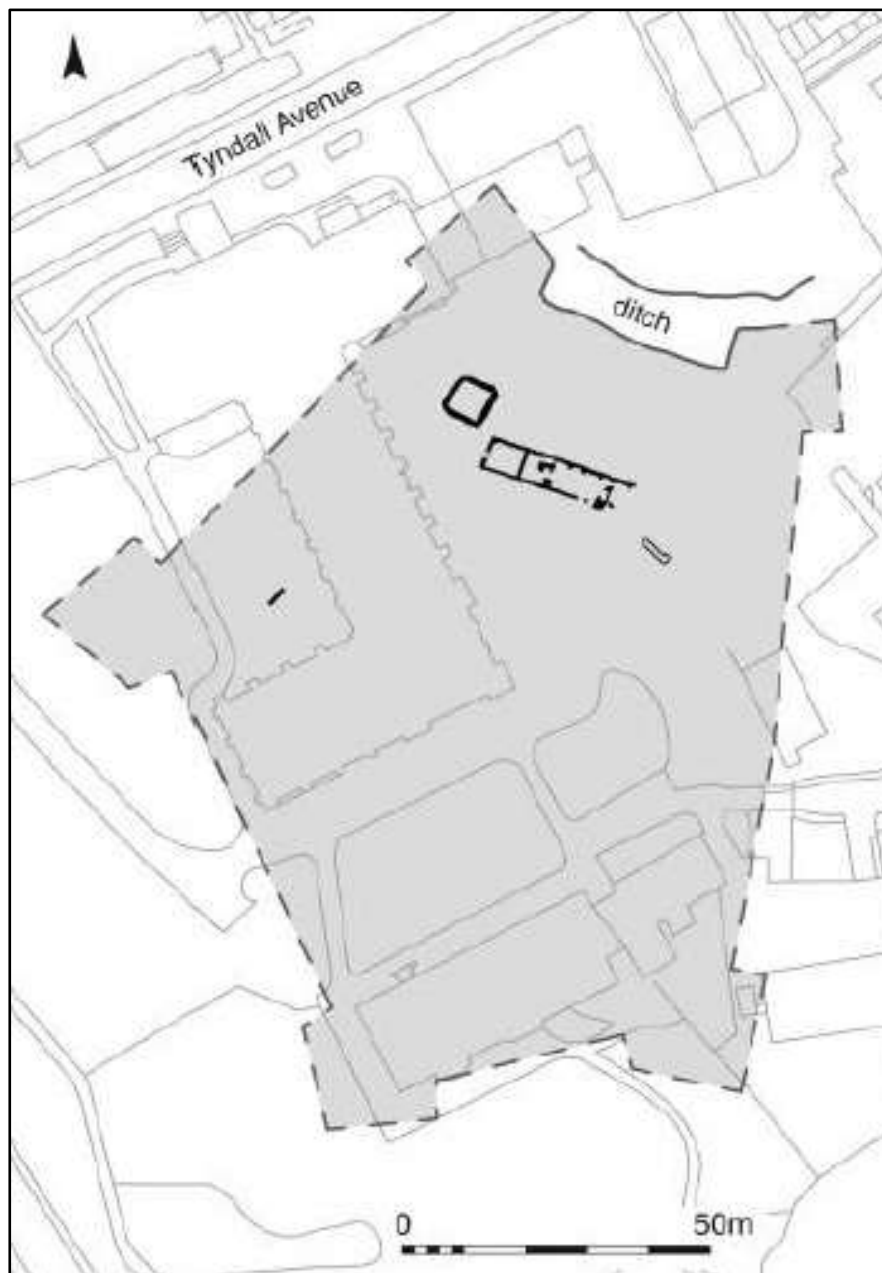


Figure 38: Plan of the Royal Fort (King 2012, figure 35, page 39)

An additional and essential criterion is the importance of de Gomme as a source. It is entirely possible that de Gomme was attempting to add support to Prince Rupert, to assist him in providing an explanation of why the Royalists were unable to hold on to the city. This could account for his suggestion that the Royal Fort was not ready to face an attack.

Excavations in 2001 revealed possible evidence of another internal building of the Royal Fort. Trench E, Context (5), contained stone, mostly of Brandon Hill grit, which was bonded together with white mortar (**Figure 39**) (Horton 2001; King 2014, 12). The use of white mortar may be indicative of another Civil War building, possibly built by the Royalists at the same time as The Long Building and magazine store.

In Trench 5, Context (07) consisted of hard compacted red loamy clay, and Context (11) had a trench-wide spread of Brandon Hill grit in a mixed orange clay loam, along with two stubs of wall that may date to the Civil War period. The walls may be internal walls of the Royal Fort (Horton 2001).



**Figure 39:** The wall with the scale on could be an internal wall of a building built inside the Royal Fort (Horton 2001)

Other excavations have revealed the Royal Fort's probable demolition, with Cromwell House being constructed into the fortification's ditch in the late 17<sup>th</sup> century (King 2003a, 7).



In 2007, excavations revealed evidence of demolition of the fortification, which interestingly included rubble and flecks of white mortar (Potter 2007, 5). Does this evidence suggest revetting of bastions? If it is revetting, this may date to 1650, as both Barratt (1789, 691) and Seyer (1823, 303, as cited by Israel 2008, 38) indicate that the Royal Fort was revetted in stone during that time. It is because of this evidence that it is suggested that the fortification built under the supervision of de Gomme, between 1643 and 1645, specifically the ramparts and bastions, would have been of earthen construction. In addition, Harrington (2003, 17) notes that the construction of the majority of fortifications throughout this period were made of earth and turf, with stone and brick added to the earthworks in limited cases, therefore suggesting that the Royal Fort would have been an almost unique feature if built of stone during this period.

Excavations in 2008 in Trench 4 revealed evidence of a wall footing (Context (413)) made of Brandon Hill grit and bonded together with greyish-white mortar; this and Cut [427], which was cut into the natural along with evidence of pink mortar in another deposit, may be connected to the Civil War fortification. Trench 7 revealed an organic-rich greyish-brown silty clay (Context (708)), which has been suggested as a natural build-up of material during the years that the Civil War ditch was open. Other contexts, such as (706), which contained stone rubble, and (707), which consisted of reddish-brown silty clay and stone rubble, represent backfilling of the fortification's ditch from the 1650s onwards (**Figure 40**). A further cut in Trench 8 [805] has been interpreted as an upper lip of the ditch of the Royal Fort (King 2008, 7–8, 11, 12).





Figure 40: Trench 7, showing the deposit fills of the Civil War ditch (facing south-west) (King 2008, Plate 15)

#### 5.6.4 Stokes Croft

An archaeological evaluation was conducted in 2007 to investigate evidence of a spurwork. In Trench 1, a steep-sided ditch with a flat bottom (Cut [125]) and a maximum depth of 1.8m was found cut into the natural geology of Keuper Marl clay, along with evidence of a wall (Ducker 2007, 2, 10, 12, 18).

Other excavations conducted on the same site in 2009 suggested that the evidence examined in the previous excavations related to walls constructed in the 1700s (Brett 2009, 2, 11).

#### 5.6.5 Gloucester Lane

Gloucester Lane is located outside of Lawford's Gate. In 2002, excavations were conducted at 30 Gloucester Lane. An L-shaped ditch (Context (231)) was revealed in a trench; the ditch had a 7.3m east–west orientation and a 9.2m north–south orientation (**Figure 41** and **Figure 42**). The context contained post-medieval pottery and clay tobacco pipes, giving a terminus ante quem of 1660. A sondage illustrated that the northern edge of the ditch was a steep 35° angle

and 2.1m in depth. The main fill (278) was waterlogged black-grey silt containing preserved animal bone, leather, wood and sticks (King 2003, 1, 2, 4, 6). This suggests that the ditch was not routinely cleared and immediately backfilled after the Civil War. The presence of animal bone may suggest that it was used as a refuse site for people from Old Market.

Fill (228) was similar in consistency to Fill (278) and represented the top of the ditch. A second sondage revealed a slope of 50°, whilst a third sondage demonstrated a steep 35° angle, with the width of the ditch at the top measuring 6.2m. A projection suggests that the base of the ditch would have been flat, 1.8m in width and 2.2m in depth. Two deposits (Contexts (258) and (261)) suggest fast backfilling (King 2003, 4). The L-shaped nature of the ditch may suggest a flank and part of a bastion for defences outside Lawford's Gate.

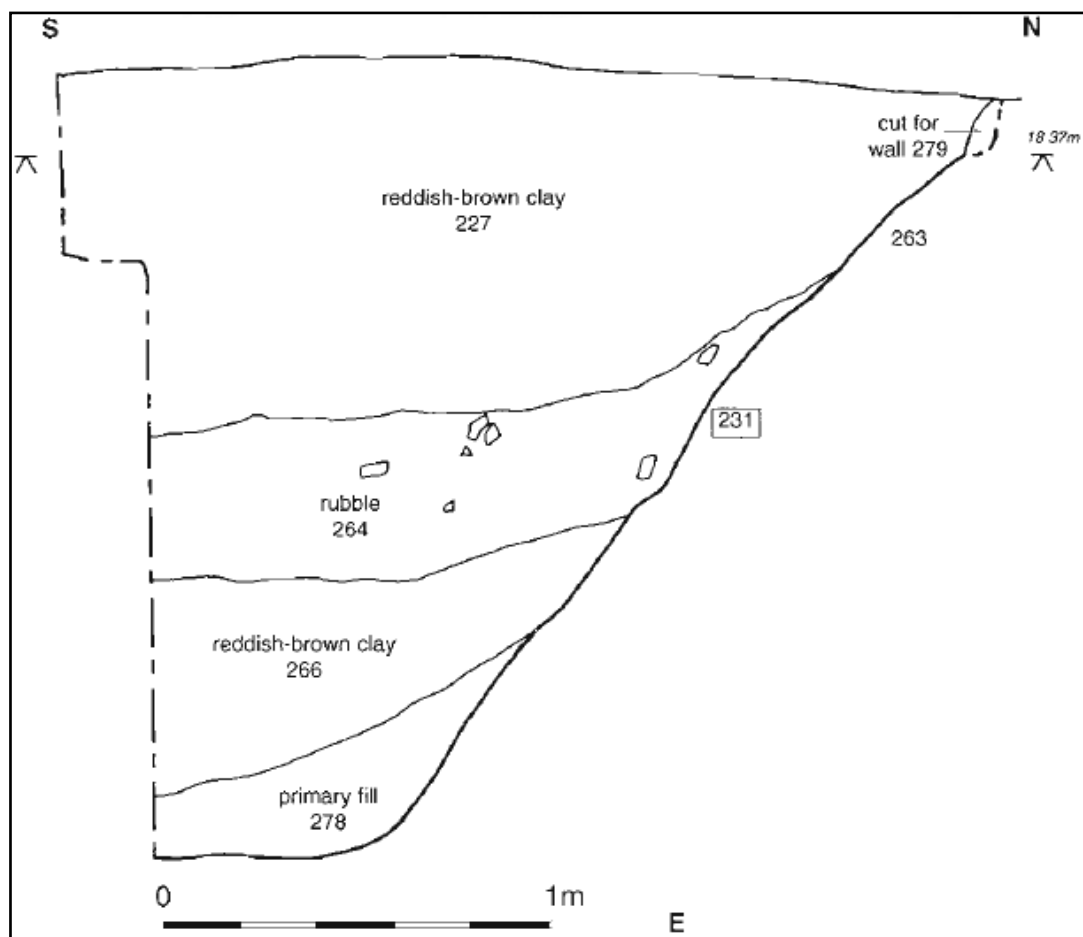


Figure 41: The east-facing section, showing Cut [231] in the ditch (scale 1:20) (King 2003, Figure 8)



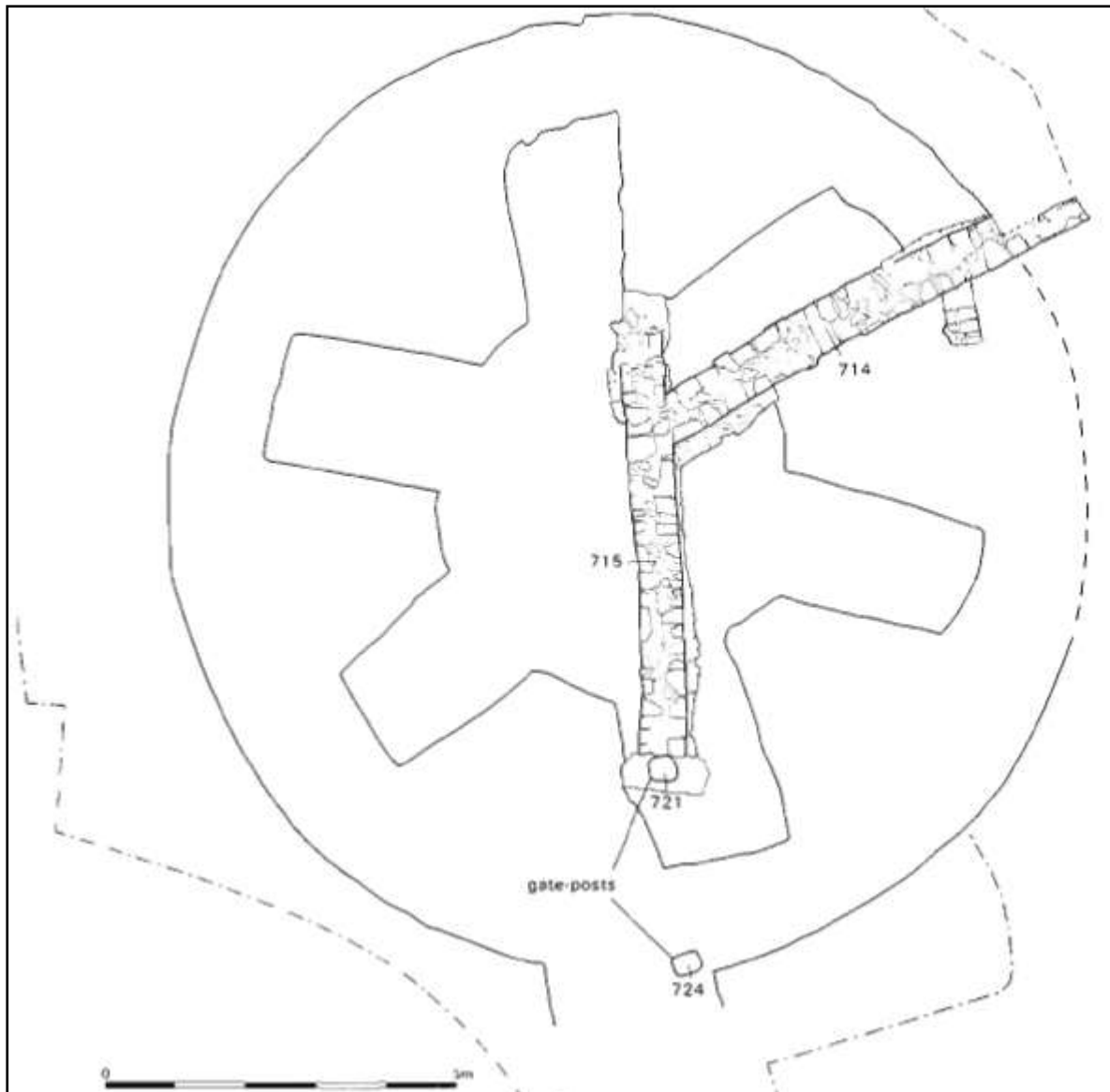
Figure 42: The east-facing section, showing Cut [231] in the ditch and the flat base (King 2003, Plate 3)

### 5.6.6 Tower Harratz and the Portwall

Excavations conducted in 1993 in Trench 5 on Redcliffe Way, on the southern section of modern-day Portwall Lane, revealed potential Civil War rebuilding of the medieval Portwall. The wall (Context (504)) was made of pennant sandstone and was bonded together with hard pink mortar, perhaps suggesting a refortification of a position (BaRAS 1993, 14–15).

Excavations conducted in 1994 at Quay Point in Temple Meads, Bristol, revealed a medieval circular tower of 13m in diameter. In Trench 7, two walls were located. The first (714) was 0.7m in width, running in a north-east direction through the centre of the tower. The second (715) was 0.6m in width, running in a south-north direction and terminating at the edge of the tower (**Figure 43**). Given the angles of the walls, this suggests construction of a gun battery to the north-east of Tower Harratz (Jackson 1994, 9, 12).

This is significant evidence of the cityscape of Bristol influencing the placement of a gun battery and evidence of the refurbishment and re-use of a medieval feature. The use of stone was rare, although a stone-faced wall with parapet was added to an earlier bank in 1643 at the Friary Goods Yard in Plymouth, Devon (Harrington 1992, 35).



**Figure 43: Walls (714) and (715) illustrating a Civil War gun battery? (Extract from Jackson 1994, figure 9)**

Evidence of a black ashy material in Trench 4 (Context (416)), which contained a mid-17<sup>th</sup>-century clay pipe bowl (marked “IEF”, by Jeffrey Hunter, *c.* 1650), suggests that a passageway (Contexts (413) and (414)) was refortified during the war. This may also represent a sally port (accessed via a spiral staircase (412)) that allowed any defenders access to the other side of the Portwall (**Figure 44**) (Jackson 1994, 13, 19, 29).

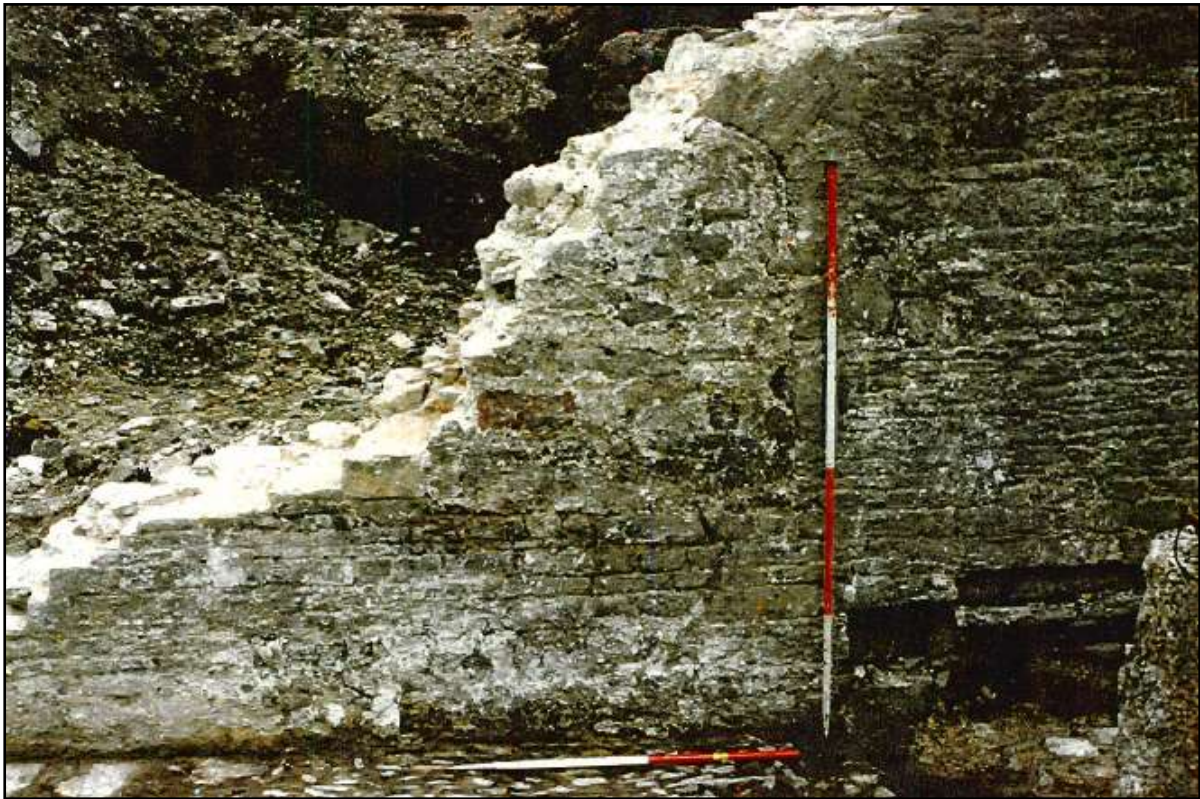




**Figure 44:** The spiral steps (Context (412)) – part of a Civil War access route? (Jackson 1994, Plate 10)

Walls (714) and (715) in **Figure 43** appear to correspond with Wall (1303) located during excavations in 1995 of Trench 13. Wall (1303) was 0.76m in width but was not bonded together with the same pinkish mortar. The wall in excavation was 2.3m in height, with its full height unknown. A further wall, Wall (1304), was located. At the angle where both walls met, the wall face was damaged (1344), which suggests that a gun loop may have been present higher up. Walls (1303), (1304), (1332) and (1333) all contained pinkish mortar, suggesting construction/re-use in the Civil War period. Wall (1332) had an opening of 3.2m, which provided enough room for artillery emplacement; Wall (1333) also had an opening of 1.97m in length for another piece. Context (1341) revealed evidence of a 1.22m wide and 1.6m high musket loophole (**Figure 45**), which had a 0.54m splay to provide a large angle of fire. The western section of the emplacement was medieval in origin and might have been connected to sluice gates to control the flow of water into the ditch. The artillery emplacement was approximately 2.5m in height. Wall (1365), with white mortar, may be Parliamentary. The pinkish mortar in Walls (1303), (1304), (1332) and (1333) may reflect a second phase of construction/repair by the Royalists; however, Wall (1365) might have connected the tower and what could have been an independent ravelin, suggesting a contemporary date for all of

the walls (BaRAS 1997, 5, 9, 10, 12). This archaeological evidence may date to 1643, when the Parliamentarians lost Bristol to the Royalists in the siege in July.



**Figure 45: Civil War musket loophole (BaRAS 1997, Plate 2)**

The overall layout of the redoubt appears to have run east–west, with a rectangular shape. The north and south walls were angled towards each other, meaning that the west end was not as narrow as the east (BaRAS 1997, 6). BRO Plan Book A 004479(1) Folio 251 (Microfiche FCPL / BKA / 35) (**Figure 46**) appears to illustrate the survival of the redoubt into the early 18<sup>th</sup> century in the form of an elongated V-shaped structure (BaRAS 1997, 6).

Excavation of the Portwall in 1965 found evidence of recutting (Layer (8)) during the post-medieval period to c. 7.7m width, with large concentrations of clay and possible tidal deposits (Fills 5 and 7). This has been interpreted as possibly being from 1642 improvements to the city's defences to prepare it for conflict (Hebditch 1968, 131, 134, 136).



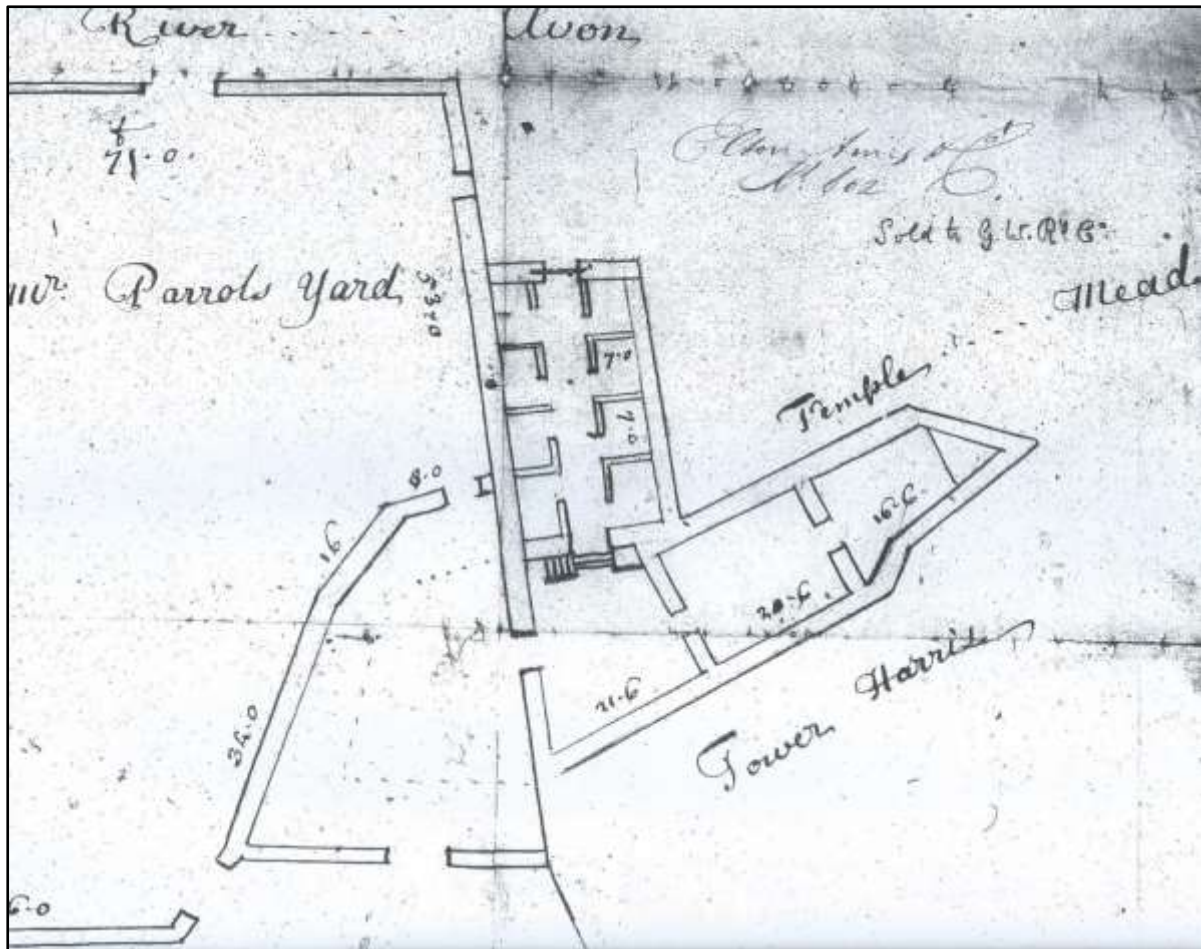


Figure 46: Survival of a Civil War redoubt into the 18<sup>th</sup> century (BRO Plan Book A 004479(1) Folio 251, Microfiche FCPL / BKA / 35)

Excavations in late 1996 / early 1997 on the Portwall at the northern end of Pipe Lane in Trench 5 revealed Context (536), which was a deposit of grey/brown ashy silt (clay) that was similar to redeposited clay in another trench on the site. This suggests a reformation of the site during the Civil War. Further possible evidence of reformation was the discovery of walls (Contexts (512), (513) and (515)) made of pennant sandstone, which was bonded with pink and white mortar. Their placement suggests blocking and thereby reformation of an entrance to a medieval bastion. However, section recording suggests a late 17<sup>th</sup>-century date (Cox 1997, 11–12, 22).

Further excavation of the Portwall in 1995 at Temple Back showed evidence of repointing of the feature during the war, using light pinkish mortar on the outer face. The ditch appears to have been recut with vertical sides lined with timber and c. 3.3m in width. Whilst it is suggested that this reflects reformation during the Civil War, no dateable evidence has been found (Tavener 1995, 5, 7, 8).

Later excavations of the Portwall at Temple Quay revealed further Civil War repairs to the feature with light pinkish mortar, with occasional elements of buff-coloured mortar. The same excavations revealed medieval embrasures/casemates. On the outside face (east section), evidence of a berm (in this example, a raised bank / artificial ridge) was located, along with 17<sup>th</sup>-century repointing of the wall (Cox 1998, 5–6). This evidence suggests a conscious effort to create an effective field of fire from which muskets and cannons could launch their projectiles.

### **5.6.7 The Watergate**

Excavations at Temple Quay revealed alterations to the Watergate during the Civil War. This included the cutting of a gun emplacement or musket loophole into the gate and the damming of a sally port. There was evidence, both inside and outside of the gatehouse, of an attempt to lessen the impact of artillery shots, with large dumps of clay positioned at both locations (Cox 2000, 1, 6–7). Placing large dumps of clay inside the gate could be seen as an attempt to ‘prop up’ the medieval structure due to a fear of collapse if the cannon balls were successful in damaging the feature. Using earth to line medieval walls was criticised by engineers of the time, with Papillon (1645, 11–12) stating “If the towne hath walls...it is not the lining of these walls...that will secure the same”. In addition, Ward (1639, 55) criticised the use of old town walls, so much so that “we may not bee deceived in putting our confidence in the strength of them”.

This evidence suggests that the most basic defence against artillery was to refortify the existing medieval features around the city. This suggests that the landscape and cityscape did affect the placement of features designed to defend the city against the artillery of the period – something that medieval walls had not been built to withstand.

## **5.7 GIS Analysis of Bristol**

The analysis of the topography and geology of Bristol in Section 5.3 provides the foundations for the analysis of where the fortifications and ultimately the artillery pieces were sited. The siting of the fortifications and artillery positions utilised the list completed by Samuel Fawcett on 28<sup>th</sup> July 1643, immediately after the capture of Bristol by the Royalists. This list, combined with the sites identified by Russell (2003, 8), provided the sites for analysis. The 1643 list also illustrates what artillery was present where; therefore, viewsheds are taken, including specific artillery pieces in their precise positions. The same sites, plus additional fortifications constructed at Brandon Hill (Outwork) and the Royal Fort, are analysed for the 1645 siege. In



addition, the author produced points for the locations of artillery positions for the Royal Fort by georeferencing the plan from King (2012, Figure 35, 39) (**Figure 32**) into the modern cartographic landscape.

#### **5.7.1. Bristol Cartographic GIS Regression Analysis**

Having examined the series of cartographic sources available in Section 5.5, further analysis is undertaken using the ArcGIS 10.5.1 programme to test the accuracy of the plans and thereby the earlier findings.

Turnor's (1802) plan of the Civil War fortifications was geo-referenced using eight links and the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr) (**Figure 47**). Generally, it was possible to geo-reference the plan to confirm that basic positions of the fortifications were accurate. Although, as the earlier cartographic analysis has demonstrated the fortifications depicted do not appear to represent a genuine representation of what was constructed.

Ross's (1887) (**Figure 48**) plan of Bristol was geo-referenced using seven links and the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr). Like Turnor's (1802), the basic positioning of the fortifications was established and illustrates why the fortifications were positioned on the north-western circuit of hills around Bristol.

It was only possible to geo-reference two control points (and the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr)) for Seyer's (1823) (**Figure 49**) plan of Brandon Hill before the image became warped and useable. Despite this lack of geo-referencing, the approximate locations of the main Brandon Hill bastion and the Water Fort were ascertained, although these generalised positions of the fortifications are not in doubt.

Attempts were made to geo-reference Straynred's (1669) plan of the Royal Fort, including using the spline geo-referencing technique, but these were unsuccessful. Part of the problem was caused by the image having no scale or co-ordinate system to focus control points on.

An attempt was made to geo-reference Millerd's (1673) plan of the Royal Fort. One of the problems encountered was trying to geo-reference the north-east bastion, however, based on the modern archaeological evidence (King 2012) and artillery position for that bastion, it is suggested that the plan is inaccurate, in particular in regards to the position that bastion, and that it should be located further north than the plan suggests.

Seyer's (1823) plan of the Royal Fort (**Figure 50**) was geo-referenced with some accuracy, despite the plan having no scale and minimal references to extant features in the

landscape, for example St. Michael's Hill road. Indeed, it is clear that the position of St Michael's Hill Road is relative in the extreme. It was geo-referenced using six links and the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr). Generally, the accuracy of the bastions did approximately conform to the positions of the artillery, and thereby the bastions, demonstrating that the plan is largely an accurate account of where the fortification was sited.

An attempt was made to geo-reference Skelton's (1825) plan of the Royal Fort, however, it was unsuccessful. When adding control points, the image became warped and was unusable. This is probably in part due because there was no scale on the plan from which to derive control points and extant features, like St Michael's Hill were not represented cartographically in any meaningful system.

Only four control points were required to geo-reference King's (2012) (**Figure 51**) plan of the Royal Fort, utilising the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr). The mapping of this cartographic source was accurate considering the data and the archaeological evidence that was assigned to it.

It was not possible to geo-reference Jackson's (1994) plan of walls (714) and (715) of Tower Harratz, as there were no surrounding features from which to utilise as control points for geo-referencing.

### **5.7.2 Analysis of Cartographic Regression Methodology for Bristol**

Examining the geo-referencing of the various maps and plans produced throughout the centuries after the Civil War has produced interesting results. The general and non-site-specific plans of Turnor (1802) and Ross (1887) demonstrate an ability to be geo-referenced into the modern landscape, but when analysing their effectiveness to plot the fortifications and artillery pieces proved cumbersome, however, this is in part due to the artistic license and generalised nature of both the plans; but overall the sources illustrated the general locations of the fortifications.

It was unfortunate that it was not possible to accurately geo-reference Straynred's (1669) plan of the Royal Fort. Like the plans of Turnor and Ross, and despite being drawn by a mathematician, the image was unable to be rectified in the modern landscape despite using the spline technique. This however, is in part due to the age of the original image and no scale from which to utilise control points.

A similar issue was encountered when attempting to geo-reference Millerd's (1673) plan of the Royal Fort, however, the exercise did demonstrate the difficulty in the position Millerd gave to the north-east bastion and highlighted the inconsistency of the plan.

Seyer's (1823) plan was able to be rectified into the modern cartographic landscape, with minimal geo-referencing. The geo-referencing demonstrated the general effectiveness of the plan in relation to the positions of the bastions constructed. In contrast, however, Skelton's (1825) plan was unable to be rectified successfully. This demonstrates an interesting issue with the methodology of geo-referencing, in this case, early 19<sup>th</sup>-century plans, as cartographic representations produced only two-years apart illustrated widely different results. Indeed, whilst Seyer's plan of the Royal Fort was able to be successfully geo-referenced, his 1823 plan of Brandon Hill was unable to be rectified in the modern cartographic landscape.

It was unfortunate that the archaeological plan of Tower Hazzard by Jackson (1994) was unable to be geo-referenced in the cartographic landscape, as this would have proven an interesting analysis of where the archaeological evidence fits within the overall scheme of the defences constructed during the Civil War.

The use of the transparency effect for **Figures 49** and **50** shows the accuracy of the geo-referencing technique and how the original images correspond to the modern 1:10,000 Raster maps available.

The overall analysis of the methodology for Bristol has shown that the plans that were successful in being geo-referenced into the modern cartographic landscape did provide a useful basis for the analysis of the positions of the fortifications constructed during the Civil War. Even plans, such as Millerd's (1673) Royal Fort, which was unsuccessfully geo-referenced in the landscape demonstrated the positives of the technique in highlighting issues with the positioning of a bastion and the caution that should be taken when analysing cartographic sources.

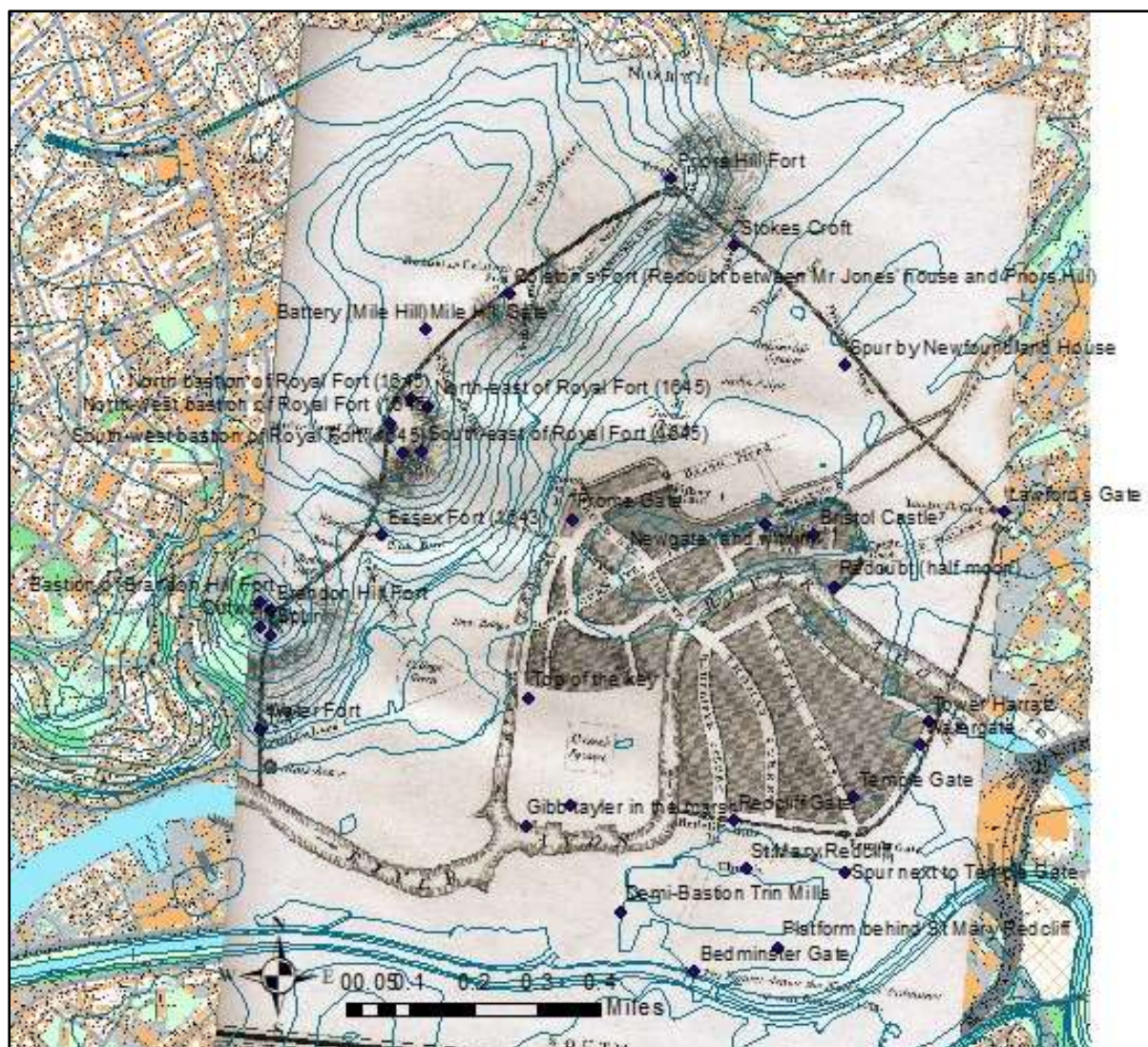


Figure 47: Turnor's (1802) plan of Bristol geo-referenced into the modern landscape (generated in ©ArcGIS 10.5.1) (scale 1:20,00)



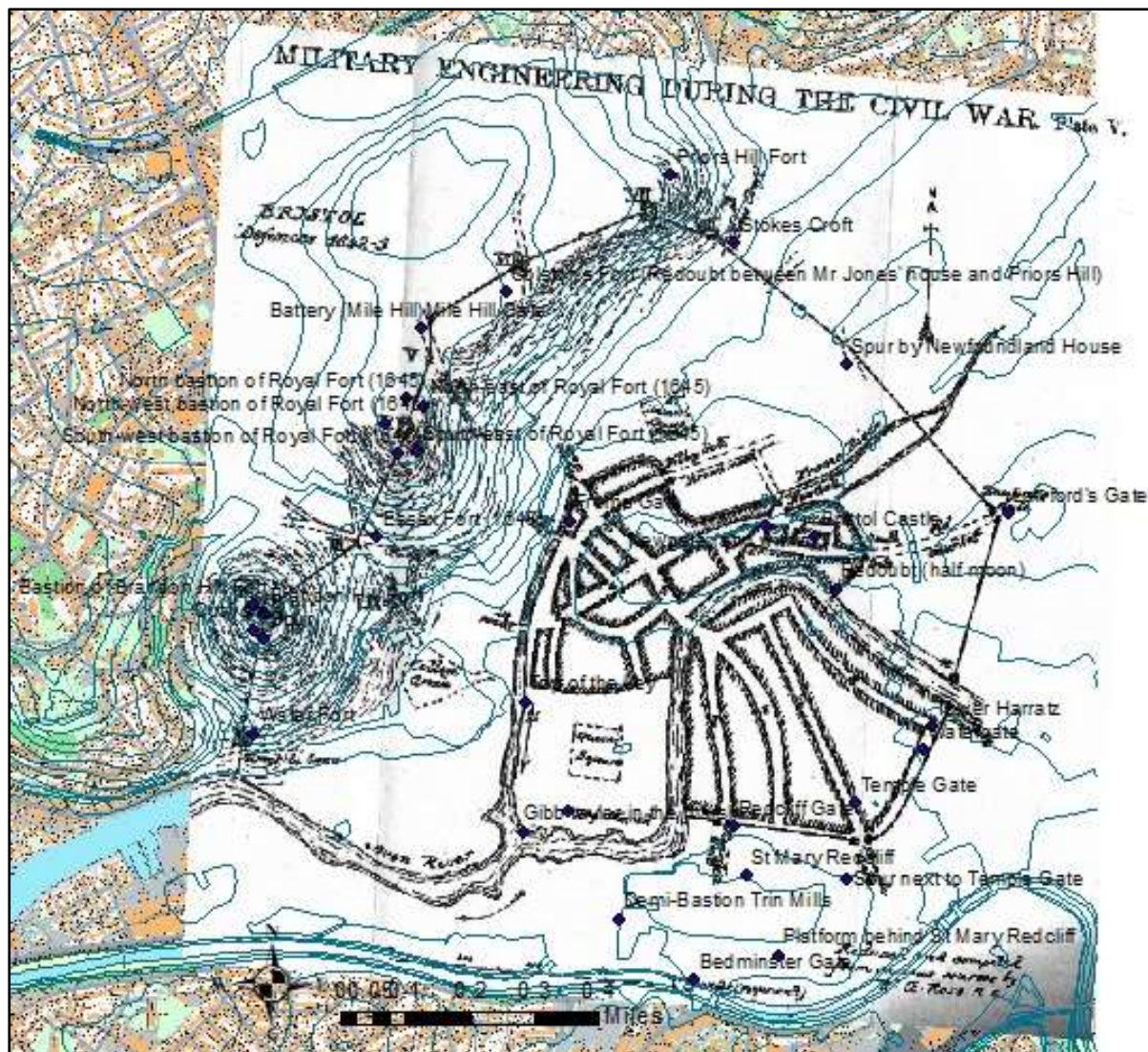


Figure 48: Ross's (1887) plan geo-referenced into the modern landscape with contours (generated in ArcGIS 10.5.1) (scale 1:20,000)





Figure 49: Seyer's (1823) plan of Brandon Hill Fort and the Water Fort geo-referenced in the modern landscape 25% transparency (generated in ArcGIS 10.5.1) (scale 1:3,000)



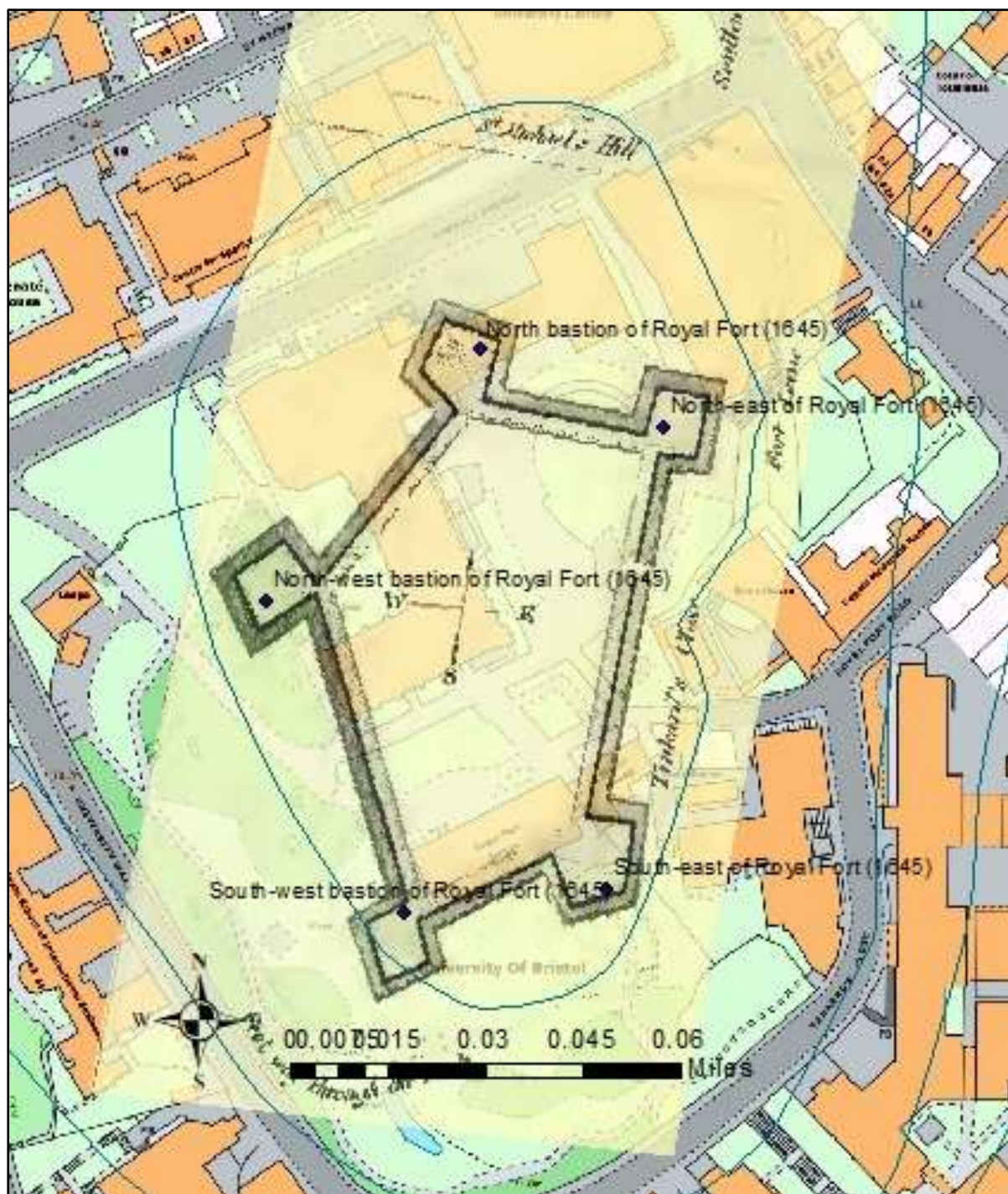


Figure 50: Seyer's 1823 plan of the Royal Fort geo-referenced in the modern landscape illustrating contours with 25% transparency (generated in ©ArcGIS 10.5.1) (scale 1:2,000)

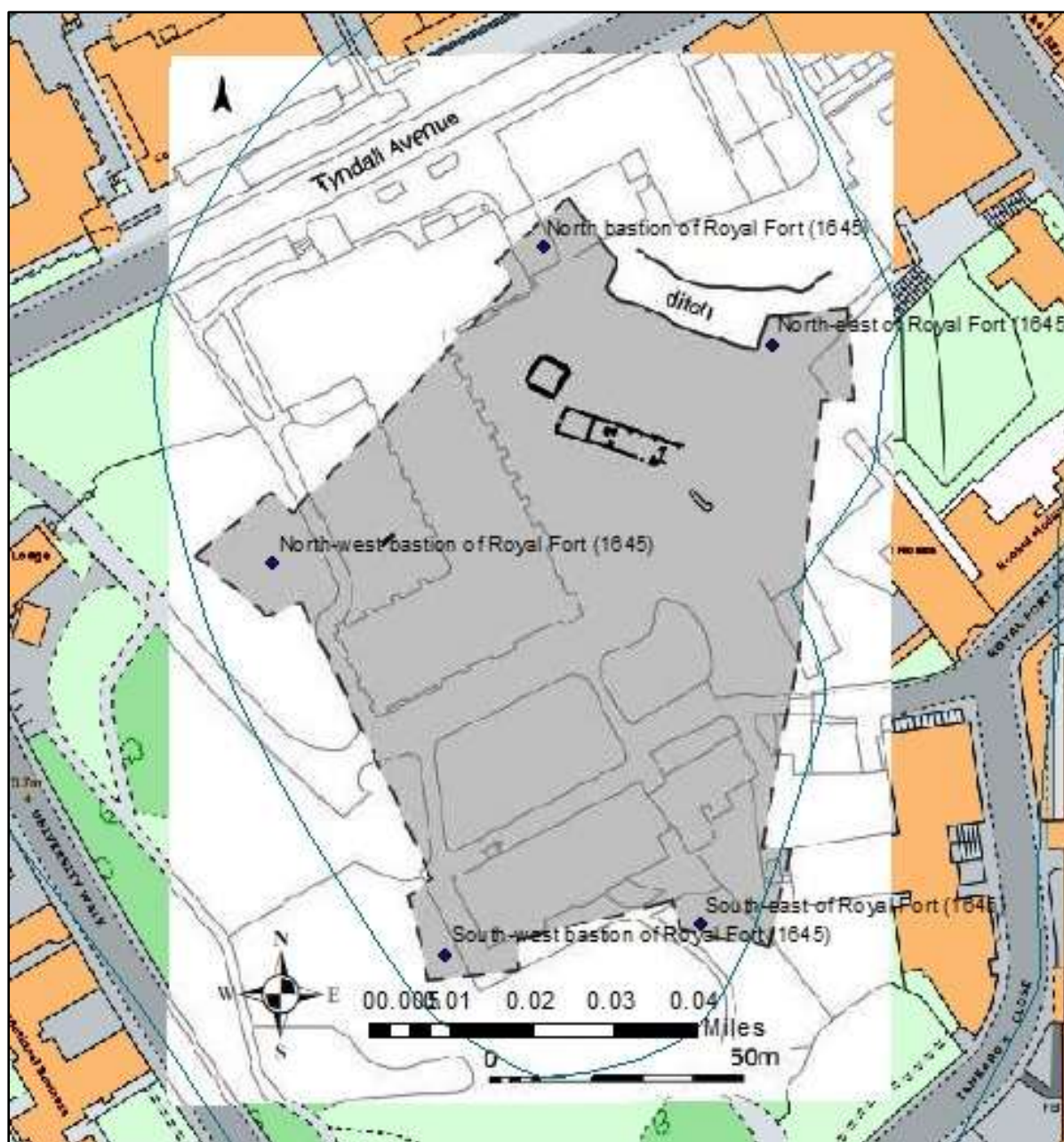


Figure 51: King's (2012) plan of the Royal Fort geo-referenced in the modern landscape (generated in ©ArcGIS 10.5.1) (scale 1:1,500)

### 5.7.3 New Bristol Cartographic Sources

Based on the above analysis, and having regard to the earlier work conducted by Paton and Cook (2016), referred to in section 2.2.6 Site Analysis, and noting that settings discussed at section 2.2.7.2 GIS Settings, including the work of Partida (2011, 1-4), the fortifications of Bristol, the Rivers Avon and Frome and the road network were drawn in ArcGIS 10.5.1 using Ross's (1887) plan, in addition to King's (2012) plan of the Royal Fort in combination with the modern 1:10,000 Raster. The features converted to graphics as a shape file using the data frame co-ordinate system.



It is interesting to note that the 12-figure grid references produced for the artillery positions for the outwork and spur at Brandon Hill do differ from the positions of the features themselves. It is important to note this issue, to be critical of the methodology and subsequent viewsheds produced from these positions, however, there is no evidence to suggest that the positions given by Russell (2003, 8) are incorrect; it appears to be a minor error plotting the positions on the modern 1:10,000 Raster.

Geological and contour data were added onto the 1:10,000 Raster, with positions of the artillery (and fortifications), including road network and rivers also overlain. The bedrock geological data symbology was modified under the value of BGSRef and the classification increased from five to 30 to demonstrate the changes in the background geology more succinctly. The label field was modified to RCS\_D to illuminate the bedrock the fortifications were constructed on. The labels for the contour data was modified to Prop\_Value, thereby illustrating the aOD of the modern landscape in metres (**Figures 52, 53, 54, 55 and 56**).

The OS Terrain DTM data, contour data the positions of the fortifications, the road networks and Rivers Avon and Frome were placed into ArcScene 10.5.1. The use of this programme demonstrated the topography of the city in 3D (**Figure 57**).

#### **5.7.3.1 Analysis of New Bristol Cartographic Sources**

The impact of the topography and geology on the positions of the fortifications is clear (**Figure 52**). Visually, the contours depicted demonstrate why the northern sector of fortifications, the Water Fort, Brandon Hill Fort, the Royal Fort, Colston's Fort and Prior's Hill Fort were positioned on the high ground around the city. Geologically the maps demonstrate the construction of the Water Fort, Brandon Hill Fort and the Royal Fort on a bed of sandstone (**Figures 53 and 54**).

The central defences (**Figure 55**) also demonstrates how the topography influenced the position of the fortification; specifically, the construction of a redoubt on the available high ground to the south of Bristol Castle, the approach from Lawford's Gate and importantly the works at Tower Harratz and Watergate covering any approach via the river.

Of particular interest is the topography upon which the southern defences described by Samuel Fawcett in 1643 (**Figure 56**). The map shows the construction on sandstone, but more importantly, the contour lines depicted that the fortifications, specifically, the spur next to Temple Gate, the platform behind St Mary Redcliff, Bedminster Gate and the demi-bastion at Trin Mills were constructed on the highest available ground.

The 3D depiction of the defences of Bristol (**Figure 57**) adds a further dimension to the analysis, and continues to emphasise how the defensive route followed the high ground. This adds further credence to **Figures 52, 53, 54, 55** and **56** by emphasising from a new angle how the topography impacted on the decision to construct the fortifications at those specific locations.

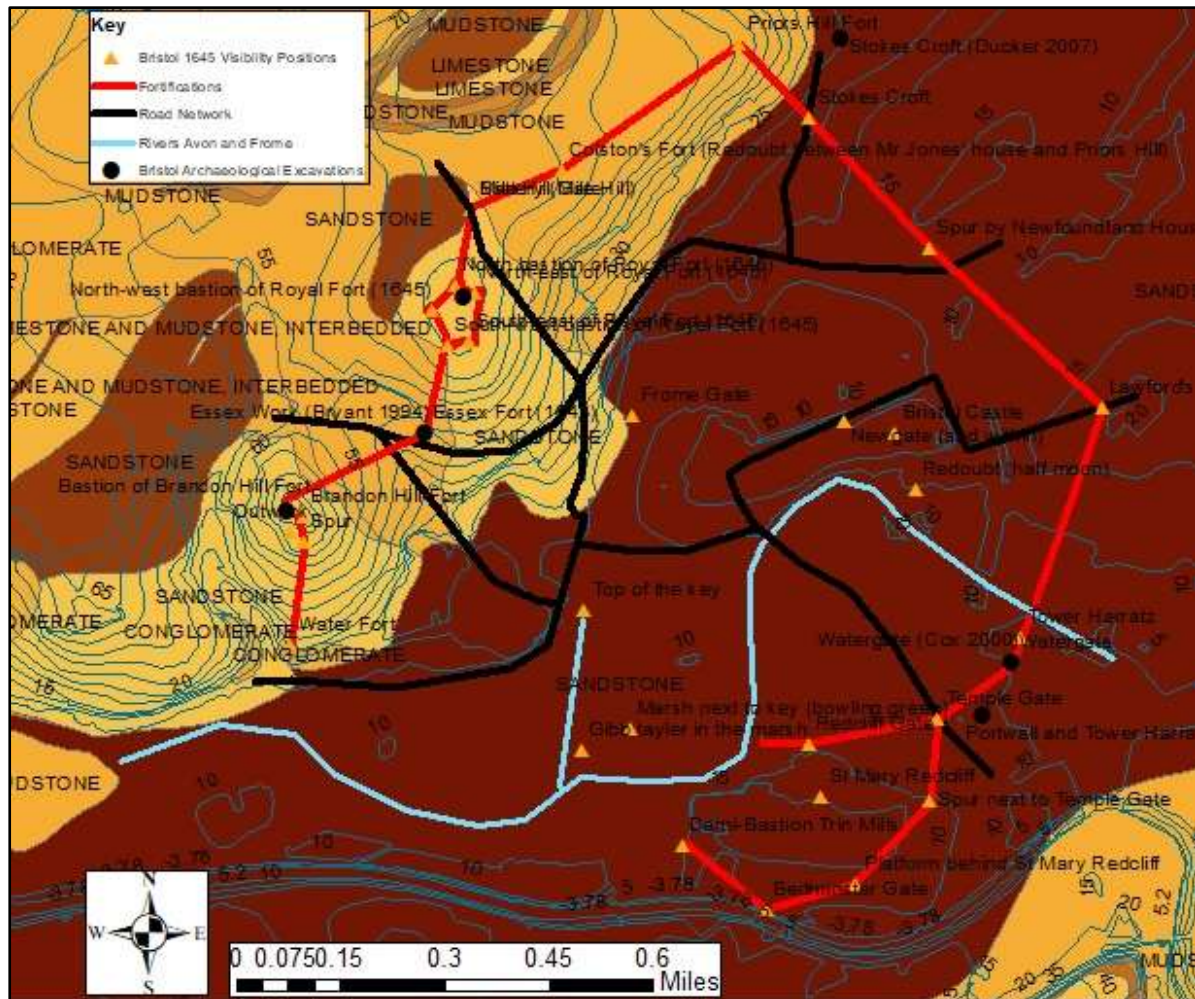


Figure 52: The Civil War fortifications of Bristol in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:17,000)

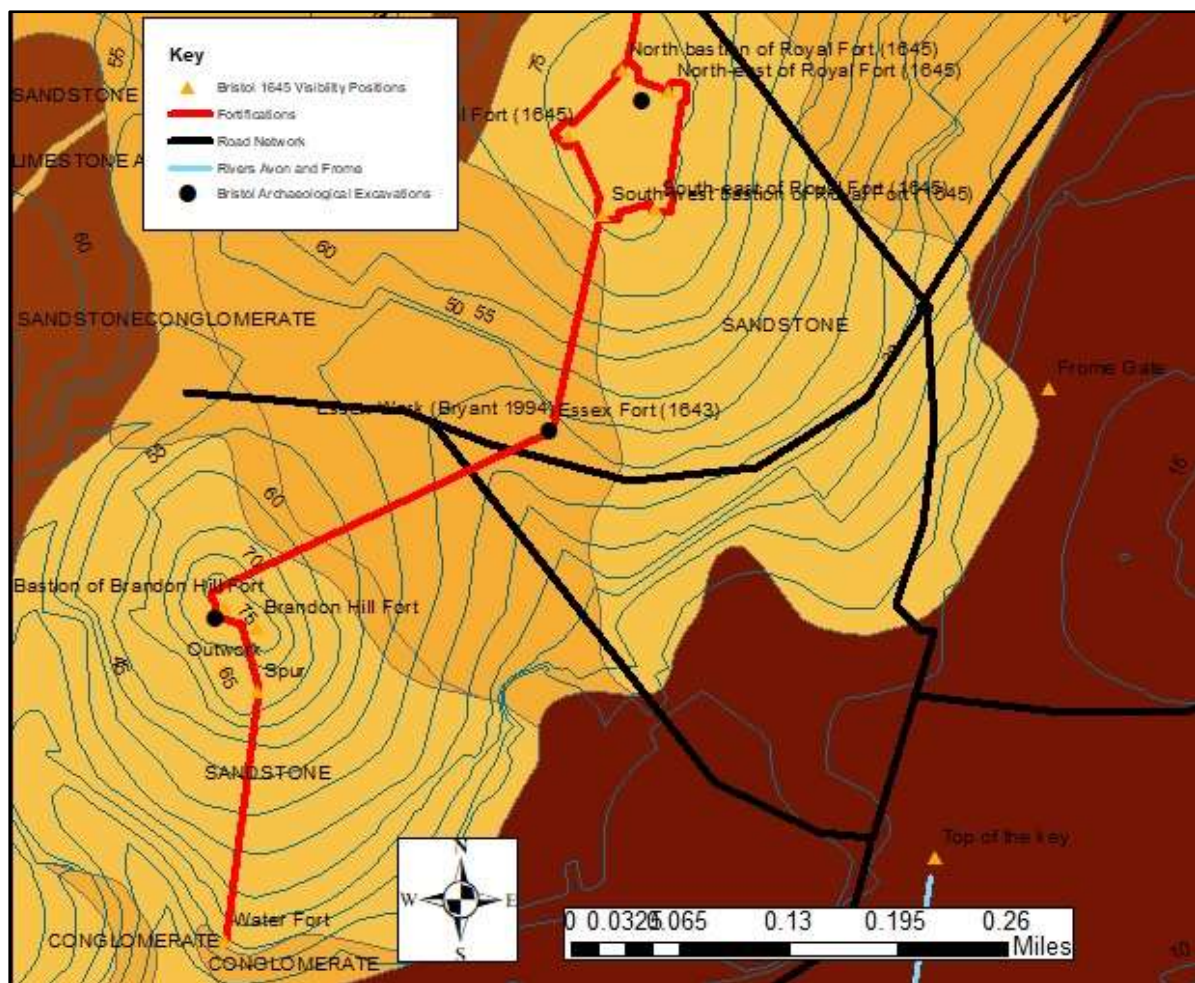


Figure 53: Focused extract showing the Water Fort, Brandon Hill Fort and the Royal Fort in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1,700)



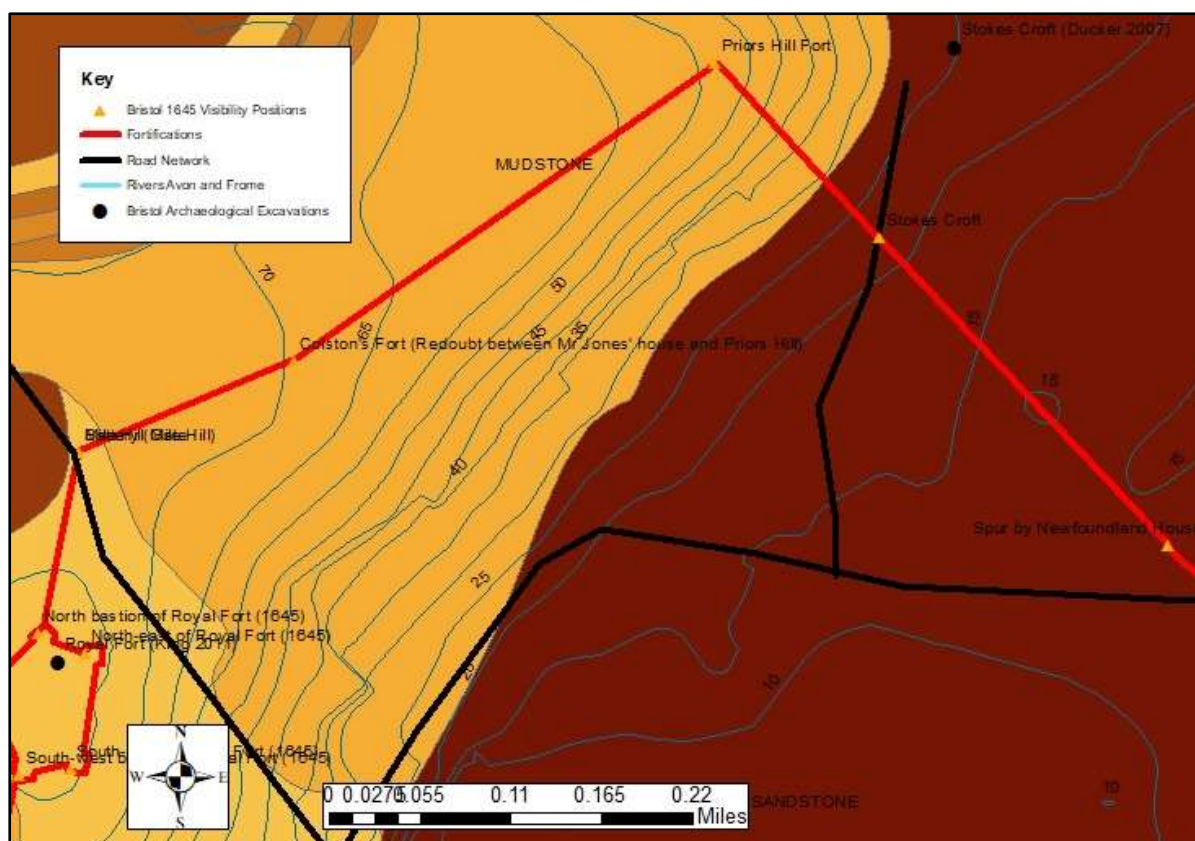


Figure 54: Focused extract showing the northern defences including Colston's Fort, Prior's Hill Fort and the spur by Newfoundland House in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:6,000)

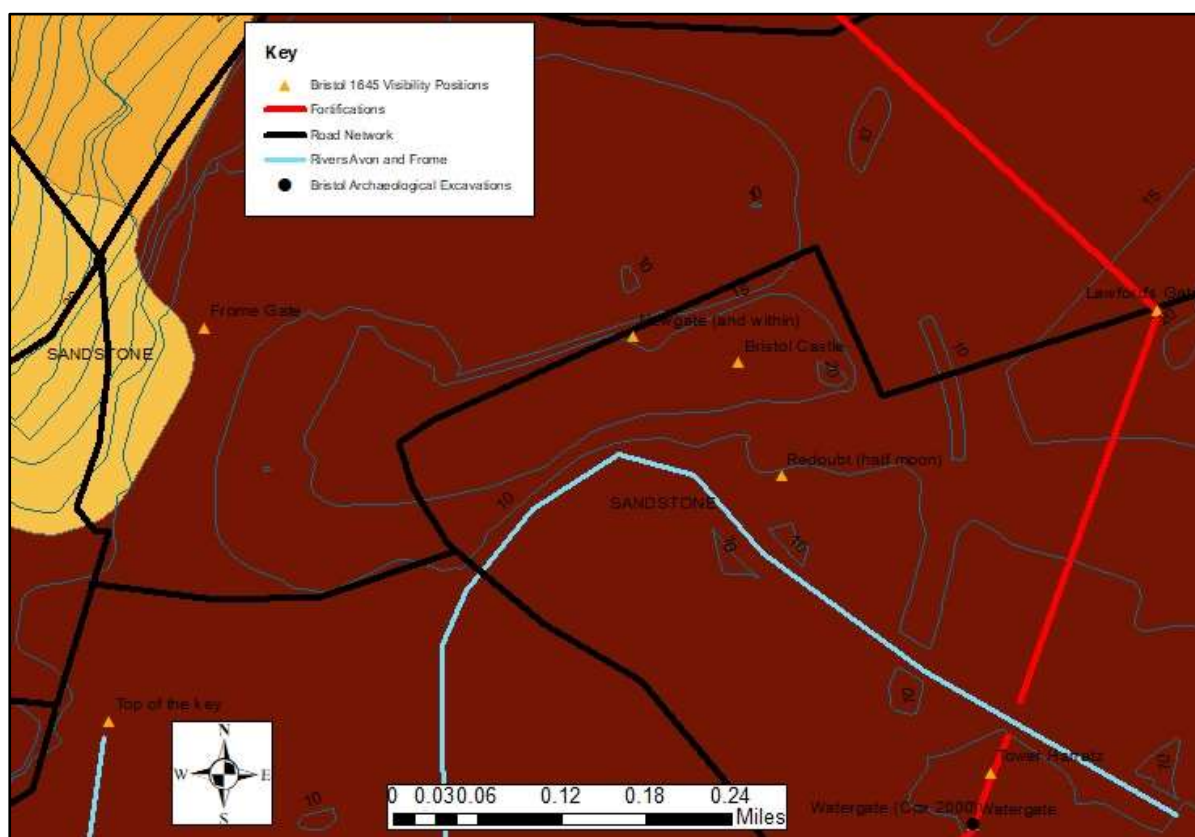


Figure 55: Focused extract showing the defences for Lawford's Gate to Watergate in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:7,000)

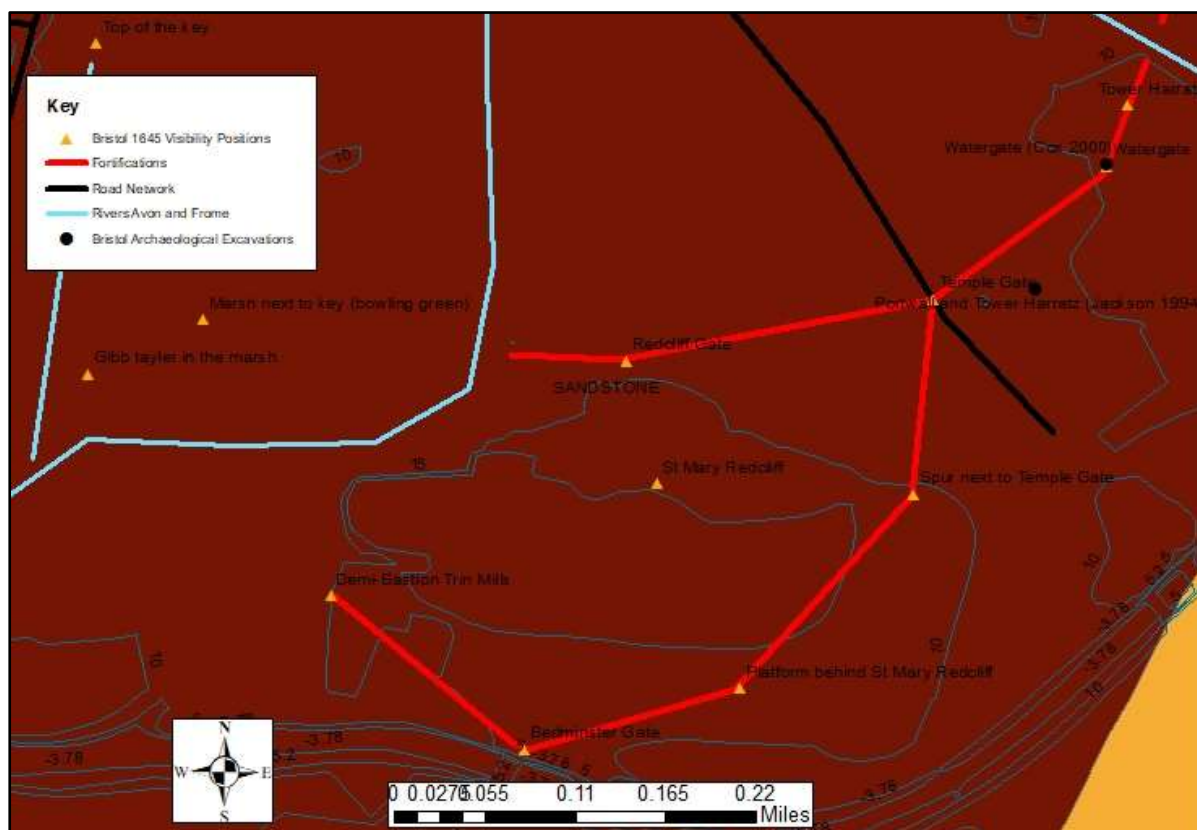


Figure 56: Focused extract showing the southern defences as described by Samuel Fawcett in 1643 in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:6,000)

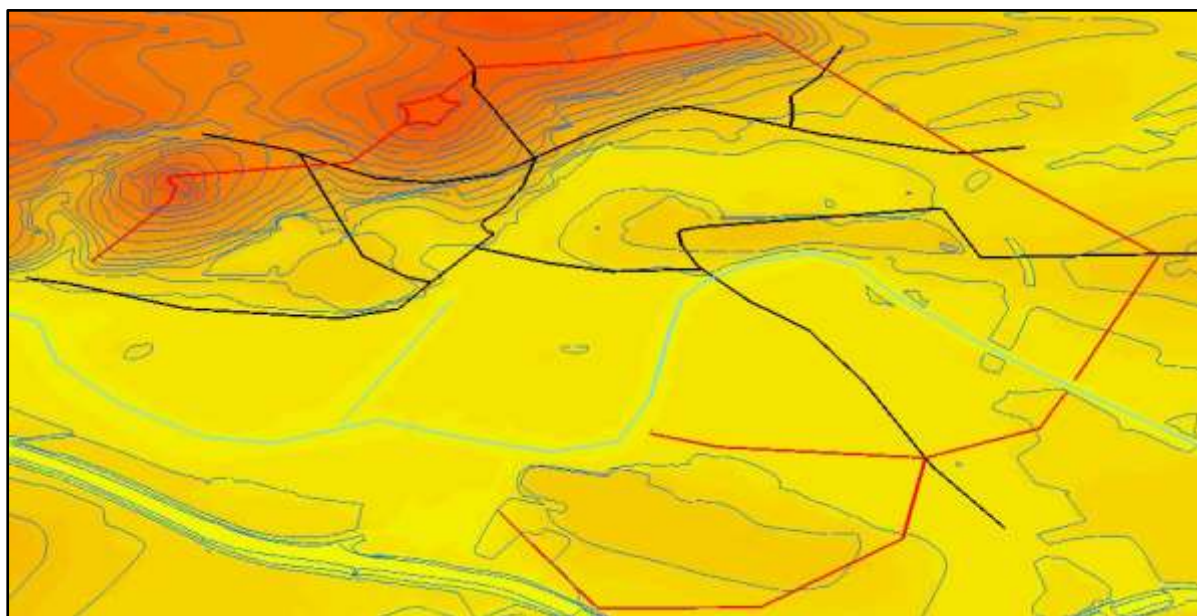


Figure 57: A 3D image of the fortifications of Bristol in the modern landscape (generated in ArcScene 10.5.1) (no scale)

## 5.7.4 GIS 'Fields of Fire' Analysis of Bristol

### 5.7.4.1 1643

Having regard to the overall viewsheds illustration of Bristol in 1643 (**Figure 58**), which shows intermittent artillery coverage throughout the northern and southern sector, the first focused viewsheds (**Figure 59**) of the Water Fort, Brandon Hill Fort and Windmill Hill Fort showing interesting results. The minion artillery piece positioned at the Water Fort covers any approach from the River Avon to the south, in addition to large section to the north towards the spur, bastion and fortification of Brandon Hill Fort. However, both the minion artillery and the musket range fail to cover the immediate locus to the west, although the visibility viewshed shows that anyone approaching from that direction would have been seen.

The position of the Essex Fort (Work) shows limited effectiveness of the muskets, although the minions at Brandon Hill Fort and Windmill Hill do provide some coverage on the approach to that fortification. The fortification of Windmill Hill (later the Royal Fort) contained the saker and minion artillery pieces. The minion piece does cover the approach from St Michael's Hill; although both artillery pieces and the muskets provide no coverage from any approach from the west; however, any troops approaching from this position would be visible.

Focusing in further detail on the approaches towards Brandon Hill and Windmill Hill, to the west of Brandon Hill, the immediate sloping landscape of the hill was visible but was outside of the range of the artillery, meaning that attackers would be safe from bombardment once within proximity of the fort. Between Brandon Hill and Windmill Hill Fort, the defensive line does not have protective cover from the artillery, leading to Washington's Breach in 1643 (**Figure 60**). **Figure 60** also demonstrates that an approach from the north-west heading south-east up the hill towards Brandon Hill would have been a viable option, as attackers would have been unseen and out of the range of the artillery and musketry until at the fortification.

Moving further north and clockwise (**Figure 61**), the battery at Mile Hill contain minion and falcon pieces. The viewshed illustrates ineffective cover of these weapons at this position, with significant problems immediately north-west; although visibility is not an issue. The same problems are encountered at the position of Colston's Fort, despite it housing minion and falcon artillery pieces, with the area affected immediately north of the fort. However, the falcon pieces at both positions do cover any approaches between the fortifications.

The defensive line between the fortifications at Colston's Fort and Prior's Hill Fort is generally protected by a saker, however, a small section is unprotected by artillery fire, but is still visible to anyone at those positions. Prior's Hill Fort has the protection of a saker on any approach from the north-east and west, along with a minion to the west and south. Although

commanding a position on a hill, the artillery coverage to the north is non-existent, although any approach can be seen visibly (**Figure 61**).

The defensive line is protected by artillery heading south-east to Stokes Croft. From this position it appears that the excavations conducted by Ducker in 2007, do not relate the fortifications of Bristol. Containing a minion artillery piece, the position has excellent all-round protection from muskets, falcon (to the north, east and west) and falconet pieces (to the south), and covers the main road into the city (**Figure 61**), albeit the falcon and falconet are some of the smaller artillery pieces available.

Moving south-east, the defensive line has good protection through to the spur at Newfoundland House, although at approximately half way along the line, due to the topography, the artillery coverage is lacking if approaching from the north-east to south-west. However, any approach could have been seen. The spur at Newfoundland House contained a saker, which itself provided good coverage, particularly to the east, south and west. This position was supported by falconet artillery to the north. The musketry support at this position, whilst protecting it, lacks precision as it does not cover the road leading in and out of the city; therefore, suggesting that the positioning of the spur further south would have better suited the defensive goals. Despite this suggestion, it is important to remember that the road network was covered by the saker artillery (**Figure 61**).

From the spur at Newfoundland House to Lawford's Gate (**Figure 62**), the defensive line has the protection of the range of the saker artillery; although from inside the city coverage is lacking, however, all approaches can be seen, thereby allowing artillery to be moved into different positions. Samuel Fawcett's 1643 list denotes a minion present at Lawford's Gate, and the viewshed analysis shows good protection at that position from muskets and the falcon, demi-culverin artillery pieces at Newgate, in addition to the significant range of artillery held at Bristol Castle. The castle itself is also afforded good protection from the half-moon (redoubt) to the south which housed two minions. Despite having the protection of a saker, Frome Gate is largely isolated from the protection of other artillery pieces, although the site could be seen visibly. This made this position vulnerable to an assault if enemy troops made it inside the medieval city. The positions of Tower Harratz and Watergate are interesting. Whilst it appears, at face value that the reason for fortifications at these positions would be to cover any approach along the river, the saker and minions, in addition to the musketry, do not provide enfilading fire along the river; although any approach using the river would be visible to the besieged. This however, appears to be an issue with the methodology of viewshed analysis, as in reality artillery would have been able to fire into the river.

The final section of viewsheds, focusing largely on the southern defences described by Samuel Fawcett in 1643 showed interesting results (**Figure 63**). The defensive line had broad coverage from Watergate to Temple Gate of the falcon and minion artillery pieces, although gaps in the coverage of artillery appear in the south-east, west and north-west, however, like all other sites not visibility. Temple Gate itself was manned with a saker with the nearest platform containing a saker, minion and falcon. The position of the fortification at Temple Gate appears vital, as it covers the road network in and out of the city and is also the divergence point for the fortifications.

The defensive line to Redcliff Gate is largely unprotected by artillery coverage, with the centre of the city having chiefly no protection (**Figure 63**). The positions to the west, across the river, namely at Gibb tayler in the marsh (which housed three minions and one robinet), in the marsh next the key and at the top of the key (which both contained minions), appear seemingly well defended. However, none of the artillery, according to the viewshed analysis itself, covers any approach by the river. A small section of the river is covered by muskets at the Gibb tayler position. This represents a strategic and tactical problem, as although there are numerous positions designed to cover an approach via the river, the viewshed analysis illustrates dicates that it was not possible to fire directly onto the river.

Returning to Temple Gate, the defensive line heading south to the spur near Temple Gate, has intermittent coverage courtesy of a minion artilley piece, but is largely undefended (**Figure 63**). The spur itself is defended by a robinet, and also has covering fire of a falcon. However, given the nature of the topography, the artillery is unable to attack positions immediately north and east. This also means that the spur was unable to support the work at Temple Gate, if that position was attacked.

The final main positions of the church of St Mary Redcliff, its platform, Bedminster Gate and the demi-bastion at Trin Mills (**Figure 63**), contained robinets, minions and sakers. The defensive line has a gap in the effective range of the artillery between the platform of St Mary Redcliff and Bedminster, illustrating a strategic and tactical weakness, although the church itself and the platform have sufficent artillery coverage. Assaulting Bedminster Gate from the south would have proved difficult as the immediate hinterland was protected by a minion artillery piece; although as an assault from the immediate west could have proven fruitful, given the lack of artillery coverage in that area. The demi-bastion at Trin Mills suffers from a lack of protection to the immediate west. The overall effectiveness of the artillery in this section appears to be sporadic and contains gaps, suggesting an assault to the west of both



Bedminster Gate and the Trin Mills demi-bastion would have been the most effective areas to concentrate fire on.

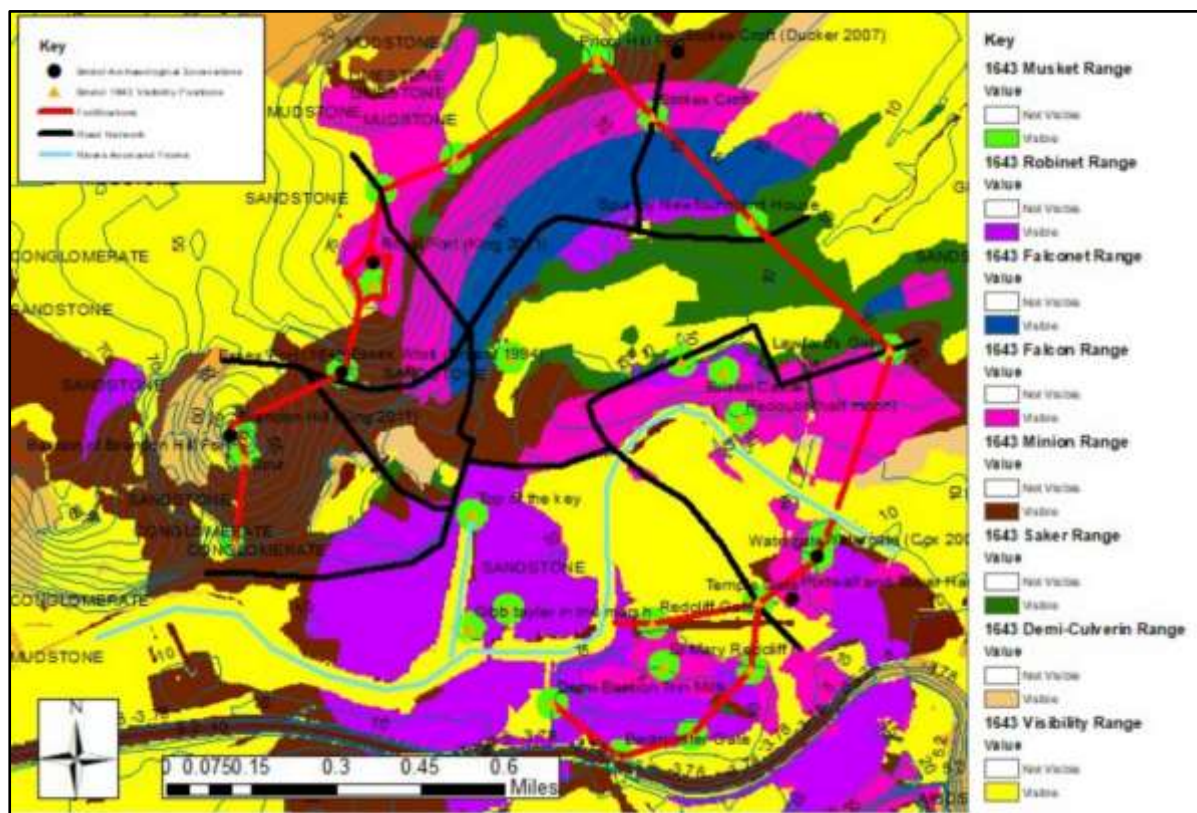


Figure 58: General 1643 viewsheds of the range of artillery and positions in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:17,000)

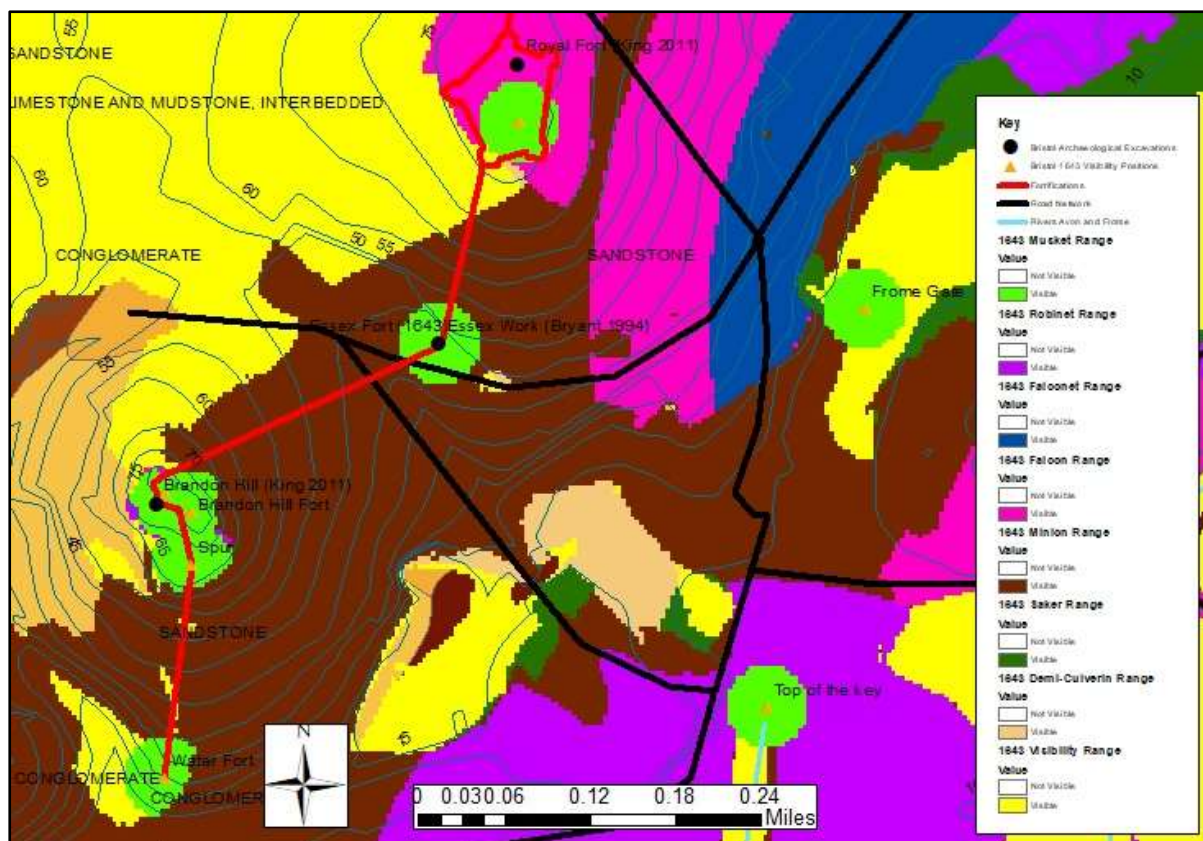


Figure 59: Focused 1643 viewsheds of the Water Fort, Brandon Hill Fort and Royal Fort in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:7,000)

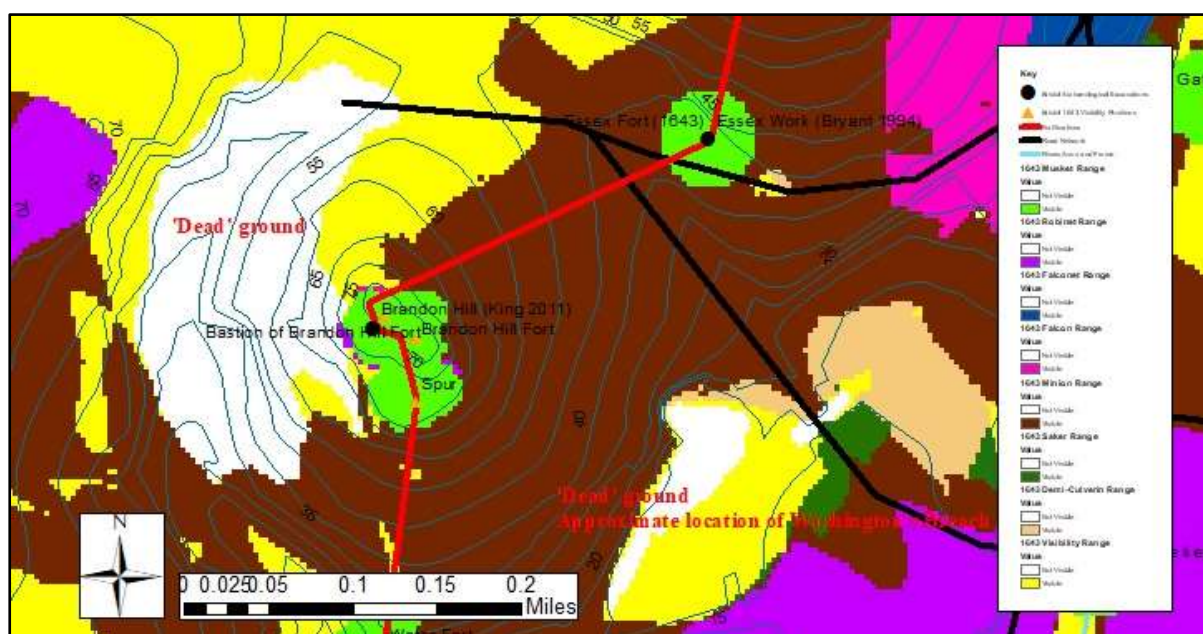


Figure 60: Focused 1643 viewsheds of 'dead' ground near Brandon Hill Fort and Washington's Breach in 1643 (in relation to the topography) (generated in ArcGIS 10.5.1) (scale 1:6,000)



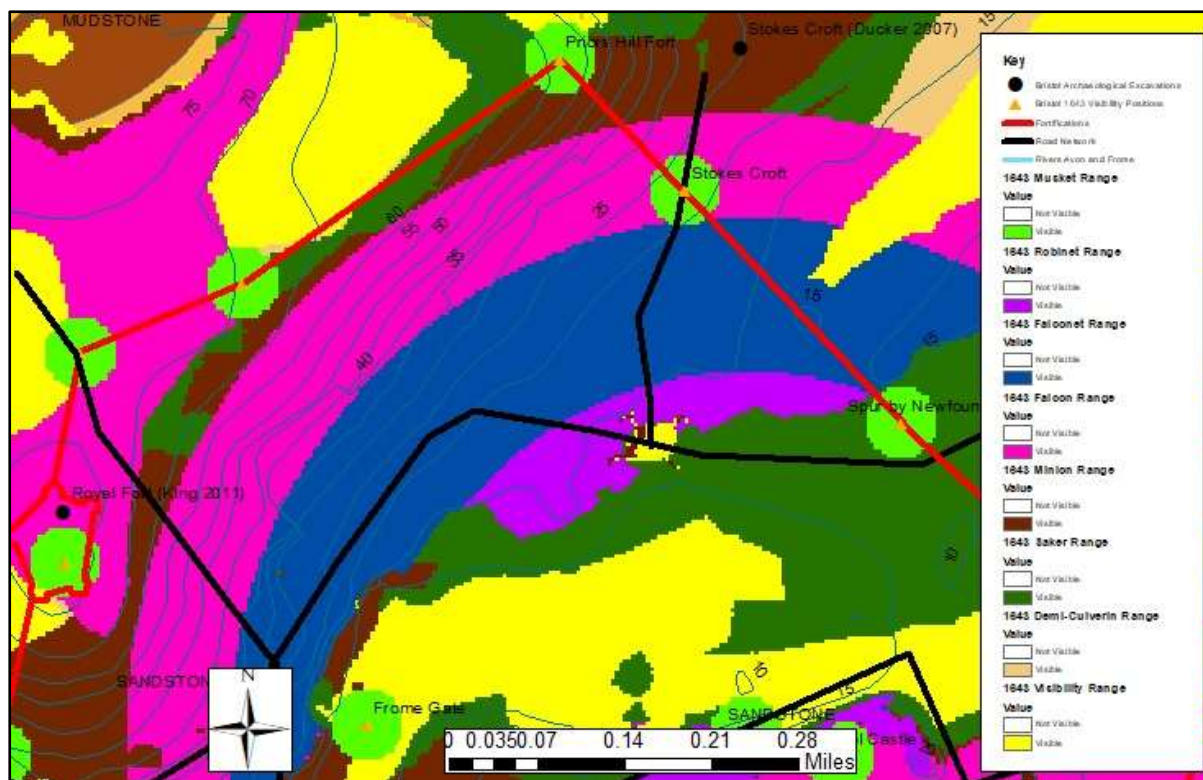


Figure 61: Focused 1643 viewsheds of Colston's Fort, Prior's Hill Fort through Stokes Croft to the spur by Newfoundland House (in relation to the topography (generated in ArcGIS 10.5.1) (scale 1:8,000)

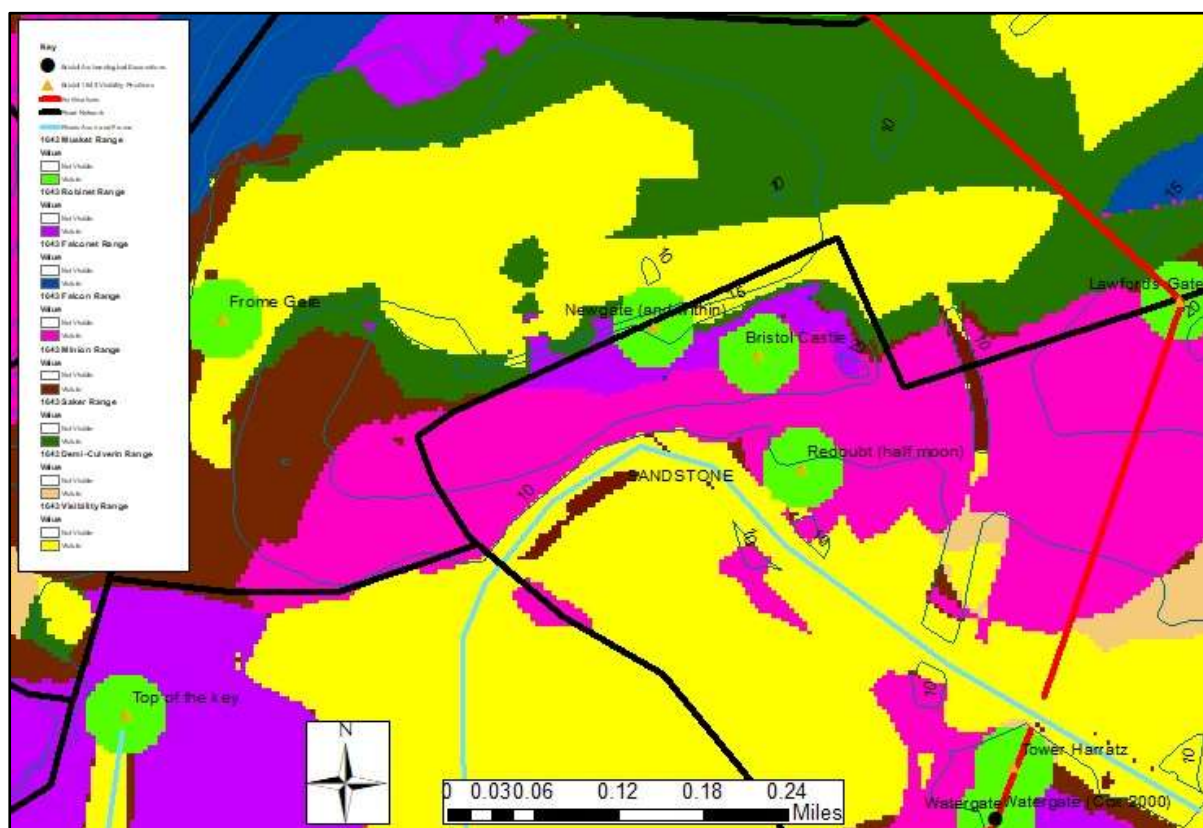
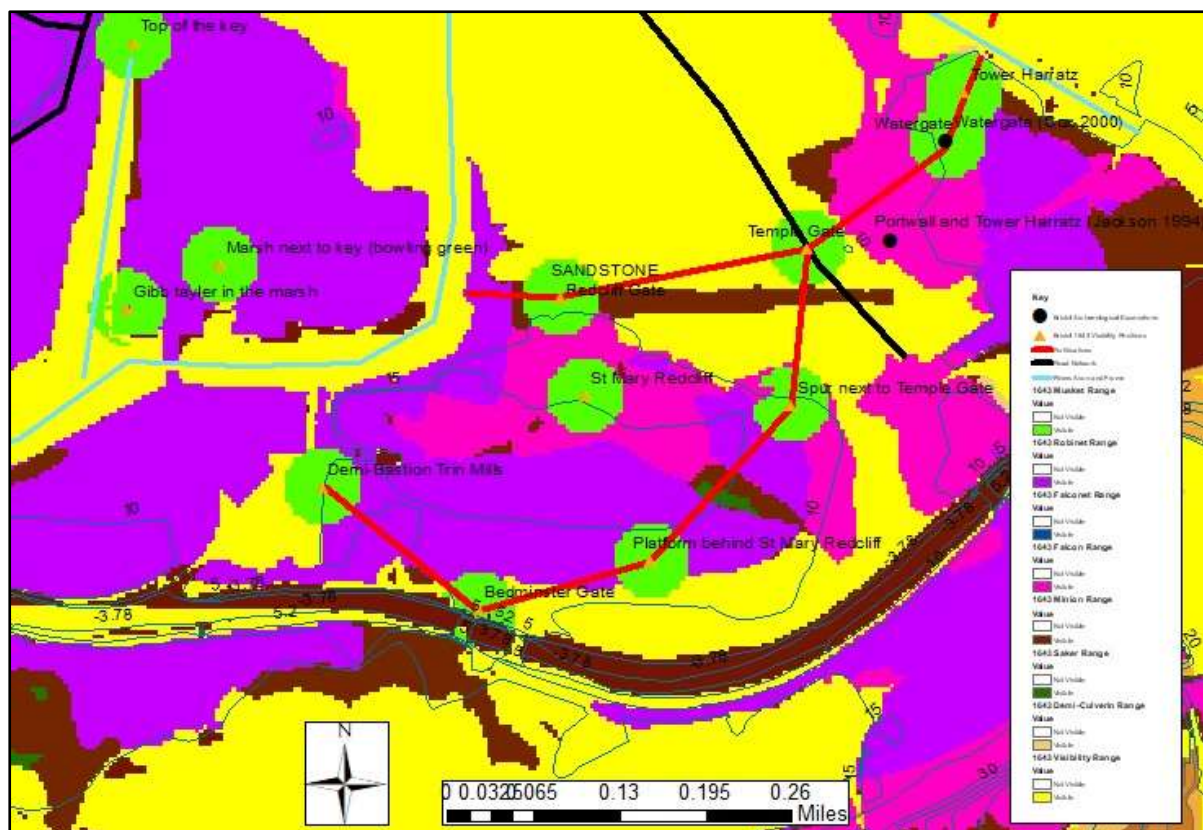


Figure 62: Focused 1643 viewsheds of Lawford's Gate, the central defences, including Bristol Castle and the positions of Tower Harratz and Watergate in relation to the topography (generated in ArcGIS 10.5.1) (scale 1:7,000)



#### 5.7.4.2 1645

The overall viewsheds of Bristol in 1645 (**Figure 64**) demonstrate much of the same issues as of 1643, although in part theoretical, (see section 2.2.7.3 GIS Issues) the focused viewsheds of the Water Fort, Brandon Hill and now Royal Fort (**Figure 65**), shows a gap in the artillery coverage to the west of the Water Fort. The defensive line to Brandon Hill Fort, despite largely having the protection of the minion is unprotected in very small areas; although not enough to cause concern to the defenders. The ‘trade-off’ for commanding the high ground at Brandon Hill remains in effect, with no visibility or artillery coverage immediately to the west.

The defensive line remains covered (**Figure 65**) to the Essex Fort (Work), although a small gap in the coverage of the artillery after breaching the work (to the south-east) remains, as does the gap where Washington’s Breach occurred in 1643. Moving to the Royal Fort, despite the addition of the demi-culverin artillery, the topography to the west of the fortification, affects the effectiveness of the new artillery, although any approach from that area remains visible. In 1645, de Gomme complained (1645, 9) that “Within one hundred foot of the Fort, there was a deepe hollow way, where the enemy might lodge what numbers bee pleased, and might be in the graffe the first night, and in that part the Fort was minable.” What the viewshed analysis has shown is that there was ‘dead ground’, albeit approximately 120 metres north-west of the northern bastion. The dead ground is now occupied by a series of buildings on the corner of Osborne Villas Road, centred on ST 58162 733380 (**Figure 65**).

Analysis of the focused viewsheds (**Figure 66**) of the Mile Hill battery illustrates that the problem remained of having no artillery coverage to the north-west of the fortification. The problem of the lack of artillery coverage to the north of Colston’s Fort remains. Indeed, the evidence for the defensive line and the fortifications at Prior’s Hill Fort, the work at Stokes Croft and the spur by Newfoundland House, show no significant change in the range of the artillery coverage compared to 1643. The evidence illustrates that the issues faced in 1643, remained in 1645.

An examination of the focused viewsheds (**Figure 67**) to Lawford’s Gate, Tower Harratz and Watergate, Bristol Castle and the fortifications at Newgate and Frome Gate show no discernible differences to the problems and successes as discussed when examining the positions of the fortifications in 1643. This is because the only major differences would be the addition of any new artillery pieces, the range of which was affected by the topography, and does not appear to have been enhanced in the two years the Royalists had to improve the defences.



Like the focused viewsheds of Lawford's Gate to and including Frome Gate, an examination of the southern defences in 1645 (**Figure 68**) show no distinct changes in the range of artillery, its coverage or what any effect the enhancement of the fortifications had in defending Bristol from 1643. This illustrates that regardless of any improvements to the fortifications and the installation of new artillery, the difficulties of defending such as large perimeter, and attempting to cover to weaknesses, or at least trying to, remained in the two short years that the Royalists had to defend a city such as Bristol.

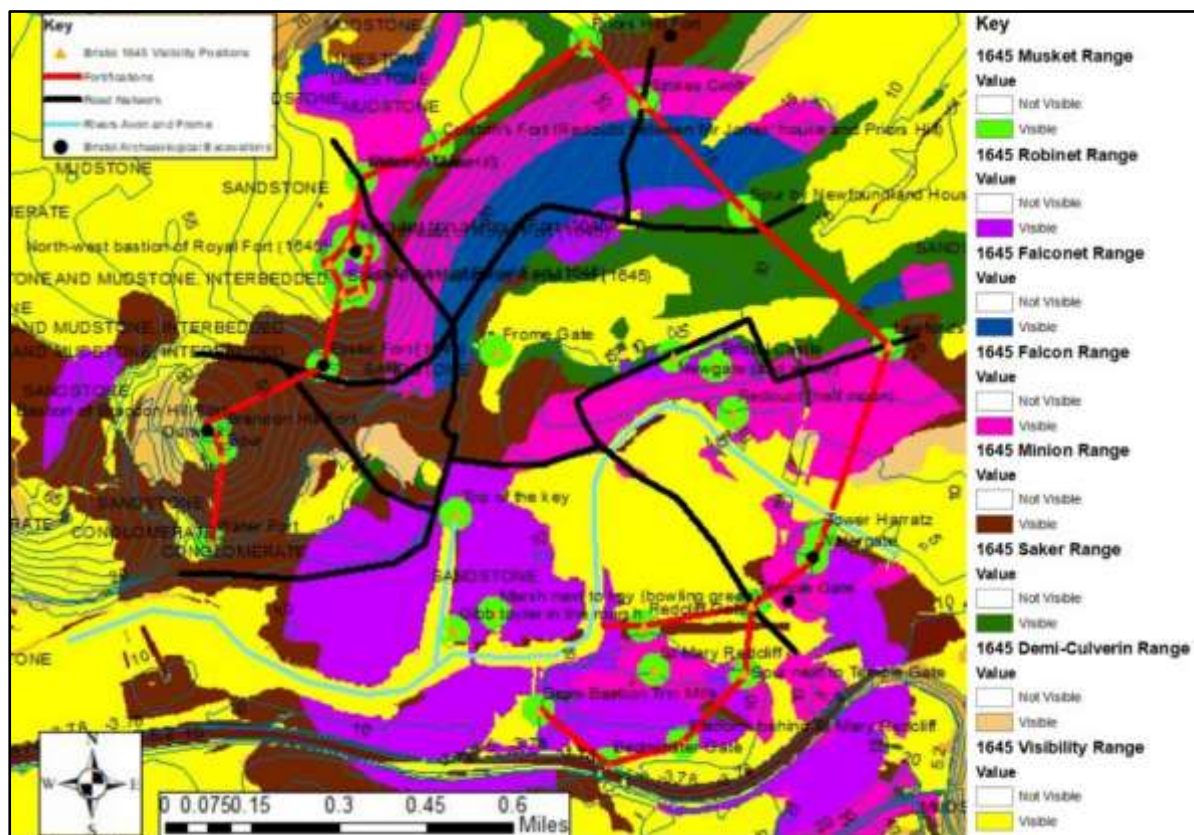


Figure 64: General 1645 viewsheds of Bristol in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:17,000)

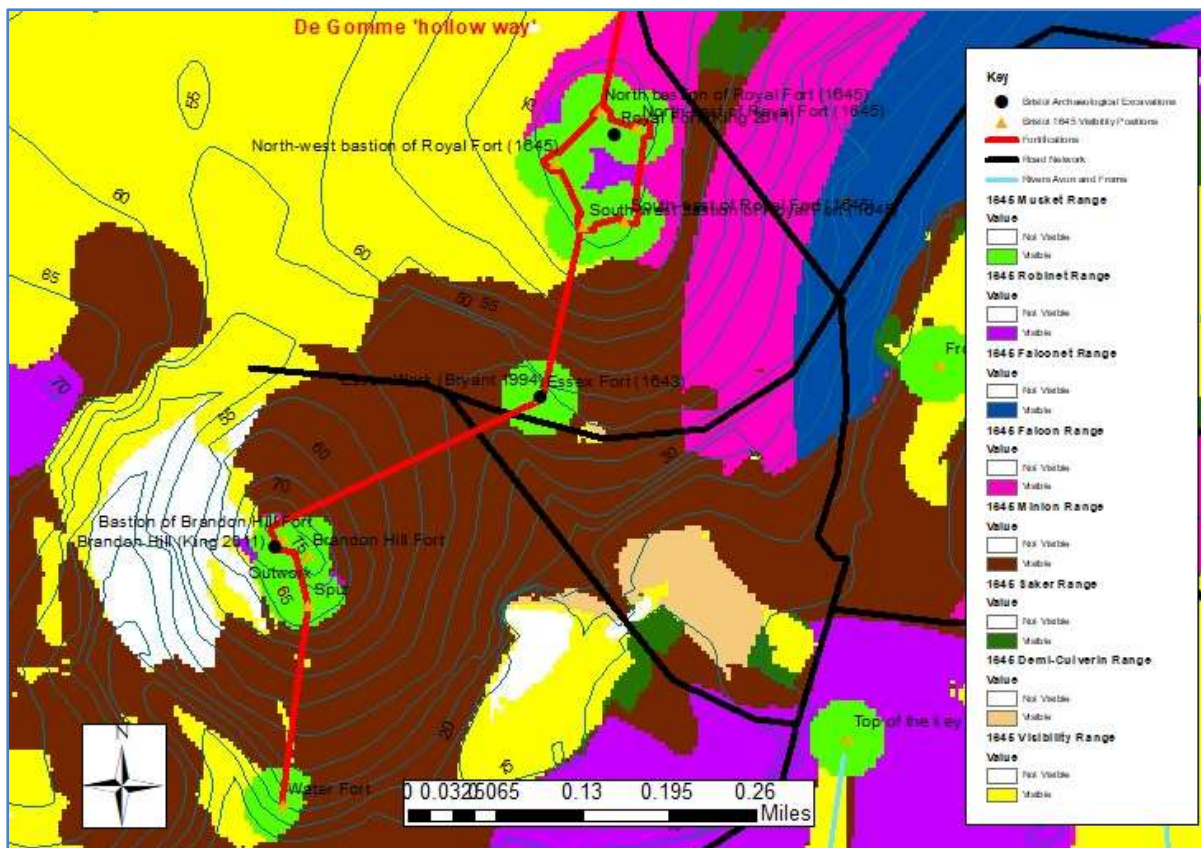


Figure 65: Focused 1645 viewsheds of the Water Fort, Brandon Hill Fort and the Royal Fort in relation to the topography (generated in ArcGIS 10.5.1) (scale 1:7,500)

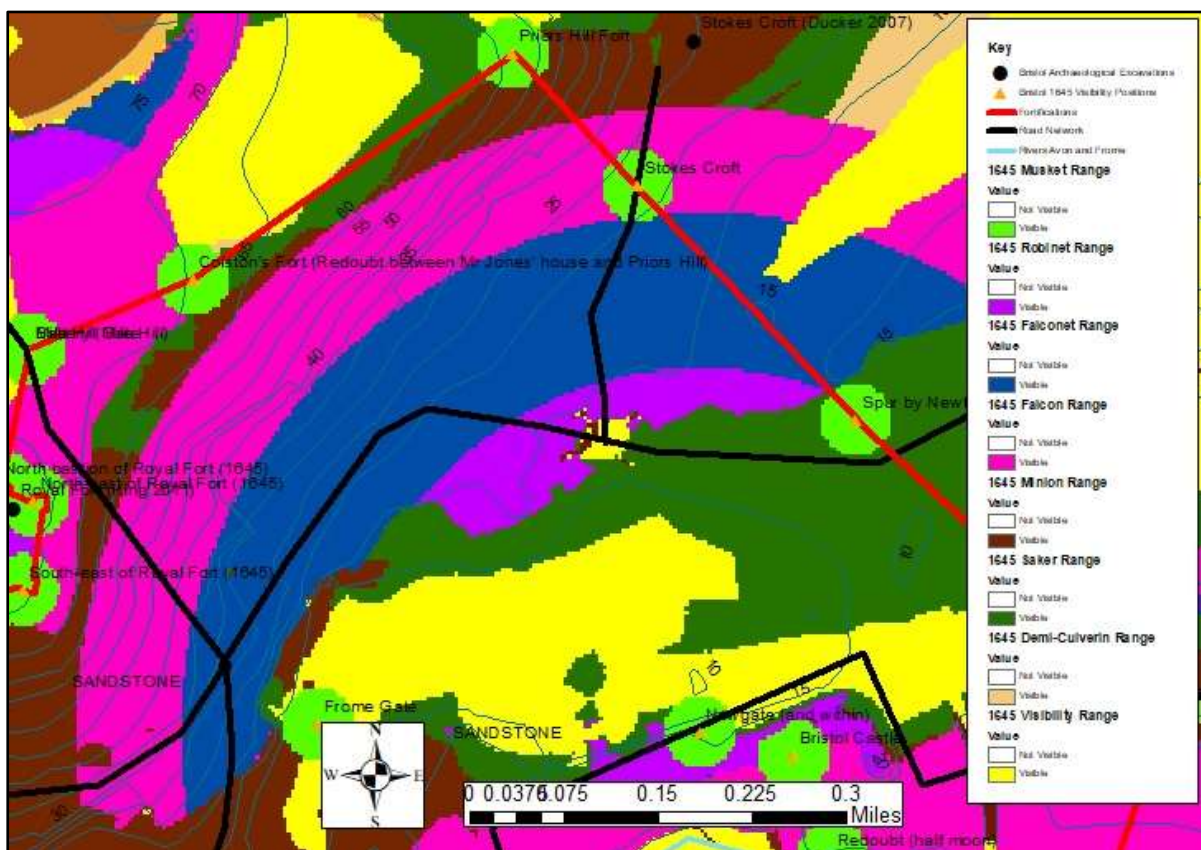


Figure 66: Focused 1645 viewsheds of Colston's Fort, Prior's Hill Fort, Stokes Croft to the spur by Newfoundland House in relation to the topography (generated in ArcGIS 10.5.1) (scale 1:8,000)



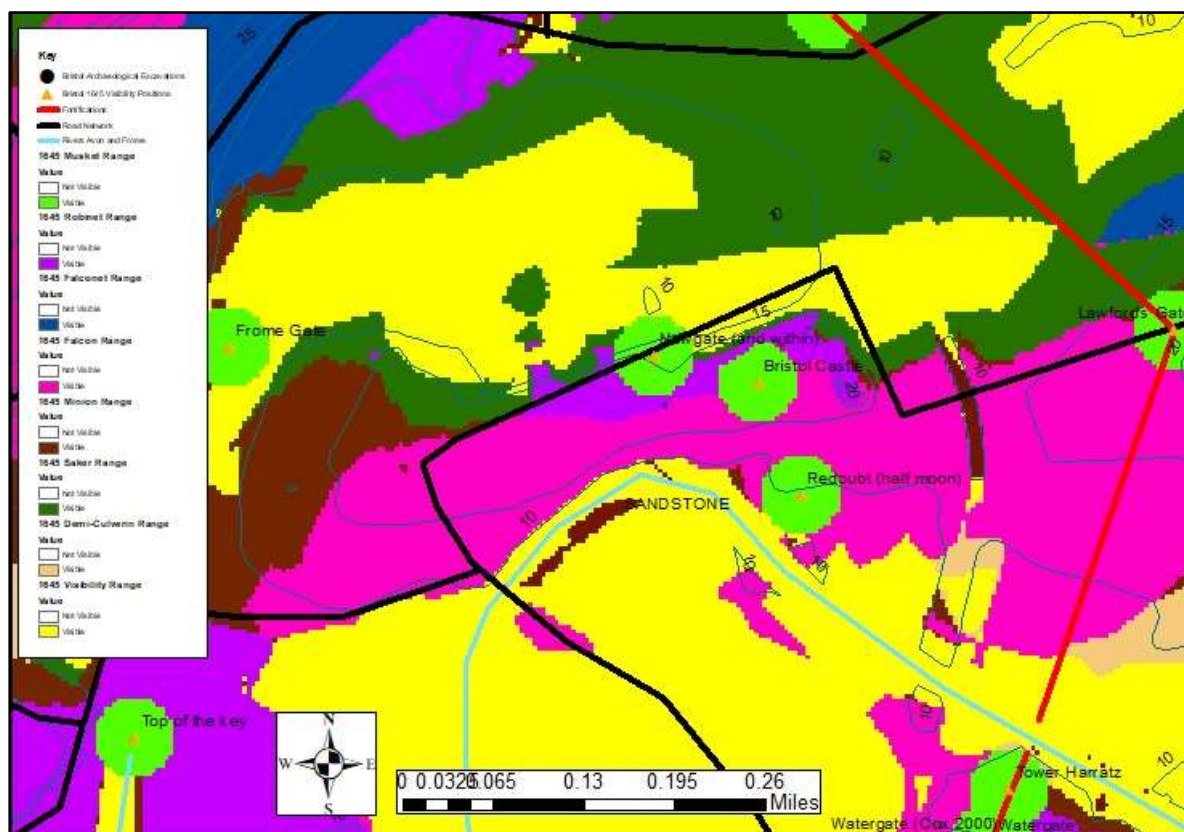


Figure 67: Focused 1645 viewsheds of Lawford's Gate, the central defences, including Bristol Castle and the positions of Tower Harratz and Watergate in relation to the topography (generated in ArcGIS 10.5.1) (scale 1:7,000)

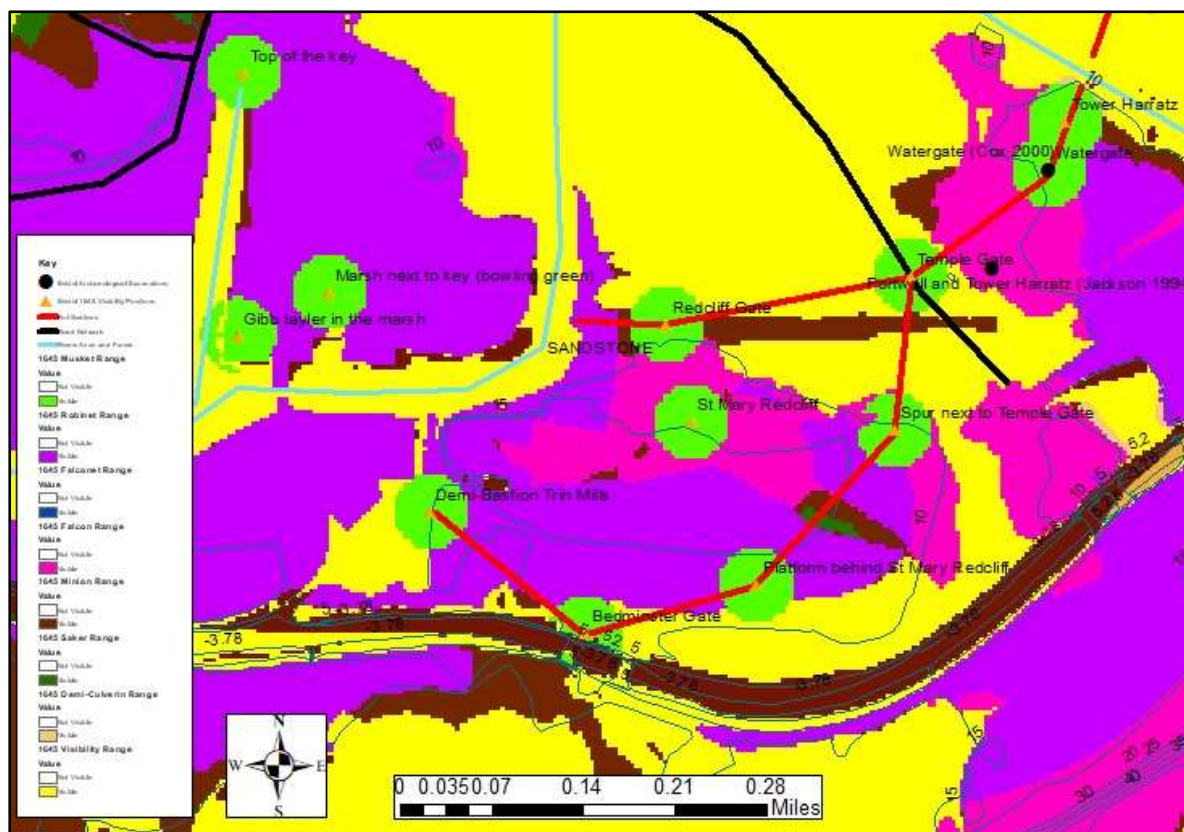


Figure 68: Focused 1645 viewsheds of the southern defences of Bristol as described by Samuel Fawcett originally in 1643 (generated in ArcGIS 10.5.1) (scale 1:7,500)



## 5.8 Legacy of the Fortifications of Bristol

### 5.8.1 Extant Features and Analysis

There are a few surviving elements of the Civil War fortifications extant in the landscape. Whilst the site of the Water Fort can be traversed through woodland, no obvious features are visible. The most important surviving features dating to the Civil War are located upon Brandon Hill and demonstrate both Royalist and Parliamentary fortifications. Surviving in part because of the creation of Brandon Hill Park in the 19<sup>th</sup> century (Russell 2003, 13), the first is the spur (**Figure 69**) constructed by the Parliamentarians in 1643.



**Figure 69:** The spur on Brandon Hill, facing south-south-west

The second feature on Brandon Hill is the outwork, which, according to Russell (2003, 13), was constructed by the Royalists *c.* 1644, albeit it without any evidence to suggest why (**Figure 70**). The shape of the outwork appears to be a bastion (Russell 2003, 13), with a small flank and part of a ditch surviving around the feature.

Both the spur and the outwork are Scheduled Monuments, and whilst this protects the features, it does mean that opportunities have so far been lost to understand construction techniques and see what the similarities/differences were in the techniques of the Royalists and the Parliamentarians.

This represents a ‘catch-22’ situation whereby excavation has not been conducted on those features, meaning that only visual and topographic surveys have been undertaken. The

lack of excavation data means that there is still much more to learn from these features. Although, valuable data could be obtained from geophysical surveys, such as Ground Penetrating Radar.



**Figure 70: The outwork on Brandon Hill, with the bastion in the foreground and the flank in the background on the left of the photograph, facing west-south-west**

Both the spur and the outwork are a direct connection in the modern world to the fortifications of the Civil War. There are no signs informing people of the features in the landscape or the fact that they are Scheduled Monuments. This indicates a lack of perception of what they represent; their legacy and protection are diminished. In order to increase appreciation of the features, one of the simplest ways would be to use signage to demonstrate that they are not merely obscure features of the park. Whilst we do experience these features and the landscape overall with all our senses (Tilley 2004, 14), it is difficult to fully appreciate, or understand at all, the landscape that we walk through if we do not know what it is we are moving through. In this case, the visual sense is dominant, particularly in Western culture (Tilley 2004, 15).



The archaeological evidence (King 2011) indicates that the presumed stone bastion with ditch was a ‘folly’ and does not date to the Civil War, but the folly itself is significant (**Figure 71**). Whilst probably dating to the Georgian era (King 2011, 11), the folly appears to represent an attempt to ‘hold on to’ a significant feature of the Civil War era, to continue the legacy of the conflict. The feature and conflict serve as an important reminder of Bristol’s past. To the Georgian era, the folly could have represented part of the romanticism of the age (Johnson 2007, 19).



**Figure 71:** The bastion and ditch folly of Brandon Hill, facing east-south-east

The aesthetic qualities of this landscape itself are an important feature. The construction of this folly can be seen as an attempt to encourage the people of Bristol and Britain as a whole to appreciate their landscape as part of their national identity (Johnson 2007, 19, 23). What better way is there to highlight the ideas of nationhood, struggle and what it means to be British than to understand and value a fortification from a time of immense social and political change? Regardless of one’s views of the conflict, it irrevocably changed the political landscape of the

country; it is indeed perhaps why in the late 18<sup>th</sup> century a similar revolution to the one in France of 1789 did not occur in this country.

The heavily modified gatehouse at the Royal Fort site is the one extant feature (**Figure 72**) that potentially dates to the Civil War (Russell 2003, 22). History records (Ireman 1645, 1–2) this being the gate from which Prince Rupert retreated from the Royal Fort and Bristol in 1645. There is a small sign at the site recording this event in history, which does in part satisfy the visual element of Western society and provides information. It does have a legacy in the contemporary landscape: a small legacy but a legacy nonetheless, as only people with an interest in the Civil War and the site of the Royal Fort would go to that place to see it for themselves. Whilst this site is unlikely to have mass appeal, it could have particular significance to local people in the vicinity of the site, as it has stood for hundreds of years in one form or another and may therefore be considered part of and become entrenched in the memories of individuals and groups who walk by or through it in their daily lives (Tilley 1994, 27).

Whilst part of the medieval Portwall survives, with a small section encased in glass near the former sites of Tower Harratz and the Watergate, other medieval structures, such as St Mary Redcliffe Church, survive, giving insight into the cityscape that would have been encountered by both sides; no other fortifications dating from the Civil War survive in the modern landscape. This fact alone explains the complex nature of examining the fortifications of the period in the landscape. As it was and is an important city, since the Civil War, its continued development has meant that the landscape has been modified heavily. Ultimately, this means that the fortifications have been removed from the visual landscape and, in part, from the subsequent consciousness of the people of Bristol and others, despite the importance these features once commanded.

### **5.8.2 Destroyed Features and Analysis**

With the survival of only three features dating to the Civil War into the present day, this represents a significant challenge to emphasising how fortifications are cared for and their legacy in the landscape.

Millerd's (1673) (**Figure 28**) plan of the Royal Fort states that "This Fort being now demolished is converted into houses and pleasant gardens". The fortification's life was over 22 years after the end of the Civil War in 1651. What this sentence suggests, however, is that for it to be converted into houses, it would have had to be a more solid structure than one simply made of earth. This contention is supported by the historical evidence of the antiquarians

Barratt (1789, 691) and Seyer (1823, 303, as cited by Israel 2008, 38), who note that parts of the Royal Fort were revetted in stone around 1650, although the archaeological evidence of Horton (2001) suggests that not all of the more substantial stone structure was destroyed.



**Figure 72: The surviving gatehouse of the Royal Fort, facing west**

By the late 18<sup>th</sup> and early 19<sup>th</sup> centuries, many of the fortifications, including Colston's Fort, Prior's Hill Fort, Lawford's Gate, Temple Gate, Redcliff Gate, St Leonard's Gate and Frome Gate, were either in a state of ruin or had been destroyed altogether (Russell 2003, 25–9, 32–33).

The fact that so much evidence dating to the Civil War has been destroyed in the subsequent centuries makes it difficult to continue and enhance the legacy of the fortifications and indeed the conflict itself. A parallel exists in northern France, when in the 17<sup>th</sup> century the area was under the control of the Spanish. However, given the events of the First and Second World Wars in the region, and despite evidence of fortified houses and churches, amongst other features, less interest is seen in the earlier period than in the events of the 20<sup>th</sup> century (Carman 2013, 93–94).

## **5.9 Summary**

The evidence in this chapter has illustrated the unique nature of the landscape of Bristol, along with the main fortifications of the Water Fort, Brandon Hill Fort, Windmill Hill Fort (later the Royal Fort), Colston's Fort and Prior's Hill Fort, which were all constructed on high ground outside the city. For these fortifications, the surrounding landscape influenced their placement.

Their design was subsequently influenced by their placement. The ditches surrounding the fortifications were insufficient; however, this was because placement was the overriding factor, with design coming second.

The significance of placement is demonstrated in the cartographic sources. Whilst no contemporary plans of the fortifications or defences exist, later plans demonstrate the reason for the fortifications' placement in the landscape.

Archaeology has also shown that the Civil War had an impact on the landscape and cityscape of Bristol and the legacy of the conflict. Excavations of the Portwall and Tower Harratz have shown the redevelopment/enhancement of the medieval wall, the recutting of the ditch and the creation of an artillery emplacement. Archaeological research of the Royal Fort demonstrates that whilst the angle of the flanks appears to corroborate the manuals of the period, the dimensions of the fortification constructed do differ significantly.

What the GIS viewshed analysis of Bristol has demonstrated is the importance of trying to control the most likely avenues of attacks. This is demonstrated in the placement of fortifications at the Water Fort, Brandon Hill and Windmill Hill Fort (later the Royal Fort). Even controlling these positions in the landscape, the defensive line was unable to be fully protected by artillery, as demonstrated by the evidence of gaps between Brandon Hill and

Windmill Hill, where Washington's Breach occurred in 1643. This evidence, along with the research demonstrating that there appears to have been a hollow way north-west to the Royal Fort, as described by de Gomme, which illustrates the validity of the archaeological technique. This research, including in depth analysis of the cartographic resources confirms the historical record. It demonstrates that there was good reason for the Royalist troops to move between Brandon Hill and Windmill Hill, as there were gaps in the line where they were unable to be seen and artillery could not bombard the advancing troops. It also demonstrates that there was a deficiency near the Royal Fort that de Gomme understood but was unable to resolve.

## **Chapter Six: The Fortifications of Gloucester**

### **6.1 Introduction**

The focus of this chapter is to examine the fortifications of Gloucester, and their placement and impact on the landscape. By studying the underlying geology, topography, historical documentation, cartographic evidence, GIS viewshed analysis, including cartographic regression, and the results of archaeological excavations, the information gathered will help to answer the research questions of this thesis; including the impact of the fortifications on the landscape, how the landscape influenced the design and placement of the fortifications, the legacy of the fortifications, and how the fortifications differed from the manuals of the period.

### **6.2 The 1643 Siege of Gloucester**

Gloucester was important for both sides during the war. For the Royalists, the trading route of the Severn Valley was blocked by it; the capture of Bristol by the Royalists on 23<sup>rd</sup> July 1643 meant that Gloucester, Southampton and Plymouth were the only significant Parliamentary territories held in southern England. From November 1641, like many cities and towns throughout the country, Gloucester was purchasing weapons and repairing its defences (Hutton 1999, 4, 99, 113). At the outbreak of the Civil War, the city had a population of 5,000. The city walls between the South Gate and the East Gate were two storeys high and around 6 feet (2m) thick. A defensive ditch of 4–5m in width was in front of the old wall, of which both continued in a north-east direction to Whitefriars Barn, turning west to the Inner North Gate. The back of the wall was lined with approximately 1.5m of earth, and some of the gate towers were also filled with earth. From Whitefriars to the Outer North Gate and Alvin Gate and west towards the River Severn ran an earthwork. An additional (second) line of defences was provided by an earthwork or old wall and ditch from the Inner North Gate underneath the cathedral to St Oswald's Priory (Atkin and Laughlin 1992, 50, 52; Day 2007, 33, 38) (**Figure 73**, albeit the bastion on the Roman/medieval wall did not exist in 1643). The final act of preparing the city for the siege was conducted by Colonel Massey, who destroyed the suburbs to the north, south and east, with an estimated one-third of the city being burnt down (Creighton and Higham 2005, 233; Day 2007, 61, 63). Day (2007, 38) suggests that Massey felt that constructing fortifications on the northern section meant that he was concerned with the threat of a direct assault on that area.



The Royalist forces of 6,000 horsemen and foot soldiers arrived with the king in Tredworth Field, at the base of Robinswood Hill, on 10<sup>th</sup> August 1643 to join General Gerrard's brigade of horsemen who had arrived at the field four days earlier (Morris 1993, 6).

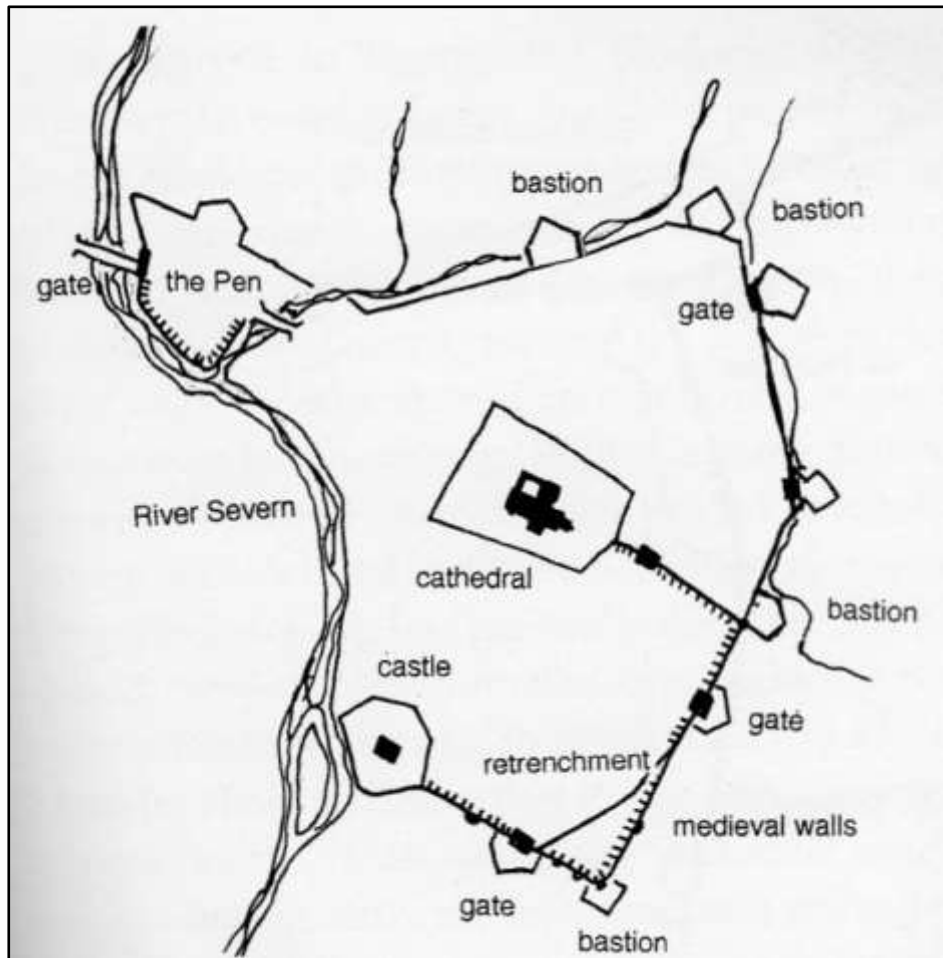


Figure 73: The fortifications of Gloucester (Osborne 2004, 63)

Prince Rupert favoured the approach of the late Swedish king (Gustavus Adolphus) to siege warfare, which involved heavy bombardment, intimidation, rapid investment and early assault with a larger number of troops than the besieged. The Dutch alternative was a mixture of bombardment, blockade and mining. This approach could take weeks, months or years. The Royalist troops believed that the Swedish method would be most effective in overwhelming Gloucester. Deciding on following the Swedish model, the Royalists set about the following tasks, considering the realities of warfare in Britain:

1. Trenches would be constructed within musket shot of the walls and defences;
2. Artillery would make a breach in the medieval walls;

3. The defensive ditch would be mined and drained of any water; and
4. Wooden faggots would be prepared to fill the ditches (Day 2007, 65–66).

Whilst the above four tasks were underway, the besiegers would fire their muskets and throw mortar bombs to reduce morale. Once the wall had been breached, assault troops supported by cavalry would be brought up to storm through the breach. If at this point the besieged refused to surrender, further assault troops would be sent and case shots would be fired from the supporting artillery (Day 2007, 65).

After the Parliamentarians refused to surrender, the Royalists moved into the suburbs on Barton Street. The Parliamentarians countered by firing five or six cannons towards Issold's house on the street, forcing the Royalist musketeers to withdraw. To the north and to The Pen at the West Gate, the Parliamentarians turned their cannons on the Royalist horsemen at Walham, also forcing them into retreat. This gave the women from the city enough time to collect turf from a meadow outside the defences. However, having only 1,400 men to guard the city, the troops at the Wineyard and the sconces at either corner of the Isle of Alney retreated to secure the River Severn (Dorney 1643, 211; Morris 1993, 6). It is important to note here that the sources of Dorney (1643) and Corbet (1645), whilst being important primary sources, must be fully scrutinised; indeed, Corbet studied Dorney's account of the siege. They are potentially subject to bias and inaccuracies because they are Parliamentary accounts. As Atkin and Howes (1993, 17) note, they are "partisan accounts written from the viewpoint of the successful defenders".

Welsh forces under the command of Sir William Vavasour approached the bishop's house, approximately half a mile from the West Gate, and crossed the River Severn to join with the Royalist forces from Worcester, who were positioned north-west of the city. Sir Jacob Ashley and his party moved into the suburbs on the eastern side of the city. The Parliamentary response was to dam the east and south ports "up, and rammed with a thicknesse of earth cannon prooffe, and the walls on that side from port to port were lined to the battlements, since there wee thought to receive the maine shock" (Corbet 1645, 45–46).

On 4<sup>th</sup> September 1643, using engines on cartwheels designed by Dr Chillingworth, the Royalists attempted to storm the area of the city between the South and West Gates. The engines contained planks of wood, whereby the cartwheels would fall into the ditch, with the planks forming a bridge on the Parliamentary breastworks to enable the Royalists to enter the city. The Parliamentary response was to create additional ditches from the fortifications, meaning that the bridges would have fallen short and ended up in the wet moat. The engines

were captured by the Parliamentarians. That same evening, the Royalists fired six great shots from Llanthony Barn, with one weighing 25lb (11.33kg) (Dorney 1643, 225–226).

To the south-west, a Royalist battery was constructed, from which the lower area of Gloucester was visible. Cannons were fired from that position, with some shots weighing 18lb (8.16kg) and two shots weighing 20lb (9.07kg). These shots were “to fly through the ayre like the shooting of a starre” (Corbet 1645, 51). As well as damaging the lead roofs of houses, the artillery also targeted the city walls and attempted to fill the ditches with faggots and earth. The men attempting to fill the ditches were protected by a gallery over the trench for four people to work under. The Royalists also attempted to mine the East Gate. In response, the Parliamentarians dug two counter-mines but had to stop due to encountering springs. It was believed that the Royalists stopped their mining for the same reason (Dorney 1643, 221; Corbet 1645, 51).

Corbet (1645, 52–53) continues, stating that “because all this side of the town had no flankers, nothing did more offend the enemy in their entrenchments than an old barne at a corner point, near the north port, in which was mounted a peece that commanded three severall ways, and obliquely looked into their trenches...This was the chiefe strength of that side, conceived the weakest part of the town. Upon the key head an halfe moon was rayzed, with a breast-work upon Seavern side under the castle, to defend an assault from those high grounds beyond the river”.

On 4<sup>th</sup> September 1643, two fires were seen on Wainlode Hill, which were answered by the Parliamentarians with lights in the college tower. The fires on Wainlode Hill indicated that the city was about to be relieved by an army under the command of the Earl of Essex. On 5<sup>th</sup> September 1643, the Royalists withdrew, burning their huts as they retreated (Morris 1993, 9–10). McGrath (1981, 43) notes that Colonel Massey and his troops were determined to fight on, unlike the Royalist forces of Bristol in 1645. Colonel Massey and 1,500 men put up a terrific defence and held the city of Gloucester for Parliament against a huge Royalist army (Hutton 1999, 114). Roy (1975, 490) explains that, on average, 17 shots were fired per day at Gloucester because the Royalists were cautious about using their supply of munitions. The weather impacted on the Siege of Gloucester, with heavy rain influencing their unsuccessful attempt to take the city (Donagan 2008, 118).

### **6.3 Topographic and Geological Analysis**

Of the fortifications constructed from the west, next to the River Severn lay the earthwork of The Pen, which lay at 10m aOD; the defensive line enclosed the northern suburb, heading east

towards Dockham Bastion, positioned at 11m aOD. Heading in a north-east direction, the next fortification was St Katherine's Sconce at 12m aOD, with the line continuing in the same direction, meeting the fortification at Chapple House, positioned at 14m aOD. From here, the line headed south-east to the small Scons, which was located at 15m aOD, turning south-south-east to Alvin Gate at 15m aOD and continuing in that direction to Captain Singleton's Sconce, which was at 15m aOD. From here, the line continued south, encountering (Outer) North Gate Bastion, which was constructed at 14m aOD. Moving south, the defensive line met the fortification at Whitefriars Barn, positioned at 14m aOD. From here, the line followed the surviving Roman (and medieval) wall, with the fortification of Fryers (Friars) Orchard (Barn?) inside the defensive line at 12m aOD. The line followed the wall, turning north-west to South Gate Bastion, positioned at 11m aOD. From here, it encountered the work at Barbican (Barbycon) Hill and later a bastion under the castle, both constructed at 10m aOD. From here, the defensive line headed north, following the River Severn towards the site of The Key, again located at 10m aOD. Outside of the city, to the west of The Key and over the River Severn, were positioned two sconces on Alney Island, constructed on land at 10m aOD, and to the north-west of the city was the sconce located at the Vineyard, Over at 19m aOD (Memory Map).

Analysis of the topography indicates that the fortifications were all constructed on relatively flat land. The advantage of high ground is all but negated, as the only sconce outside of the city that held any significant level was at the Vineyard at 19m aOD. Therefore, if high ground is lost or is, as in this case, unavailable, the placement of fortifications must rely on other factors.

Geologically, all the fortifications were constructed on bedrock of Blue Lias Formation and Charmouth Mudstone. The sites of The Pen and Dockham Bastion sat on soil of alluvium containing clay, silt, sand and gravel, whilst the sites of The Key, the bastion under the castle and the sconces on Alney Island sat on tidal flat deposits containing clay, silt and sand.

The sites of Alvin Gate, Captain Singleton's Sconce, the North Gate and Whitefriars Barn sat on soil of Cheltenham sand and gravel. Based on soil analysis alone, the placement of these fortifications was significant in the landscape.

Finally, the sites of St Katherine's Sconce, Chapple House, the small Scons, the South Gate, Barbican Hill and Friars' Orchard all sat on a heavy-to-medium clay loam, as did the sconce on the Vineyard. A heavy-to-medium clay would have been difficult to excavate; however, thick clay could have provided some protection against artillery shots.

## **6.4 Historical Analysis of Gloucester**

### **6.4.1 Corbet's Account of the Defences of 1643**

John Corbet (1645, 42–43) describes the defences of the city of Gloucester on 10<sup>th</sup> August 1643 as follows:

*“The works of a large compasse, not halfe perfect; from the south-gate eastward almost to the north port, the city was defended with an ancient wall lined with earth to a reasonable height; thence to the north-gate, with a slender work upon a low ground, having the advantage of a stone barn that commanded severall wayes: upon: upon the lower part of the city, from the north to the west-gate, (being a large tract of ground) there was no ancient defence, but a small work newly rayseed, with the advantage of marish grounds without, and a line drawn from the inner north-gate under the colledge wall to the priory of St. Oswald's.*

*From the west towards the south-gate along the river side, no more defence than the river itselfe, and the meadows beyond levell with the town: from the castle to the south-port, a firme and lofty work to command the high ground in the suburbs. The ditches narrow, but watered round. In this posture did the city stand when the king's forces hovoured over the hills, and now and then skirted upon the town, before a close siege was laid : upon the tenth of August”.*

It is reported that *“The enemy was indefatigable and swift in the entrenchments. The workes from the south and east gates, hasted to meete each other ; their preparations seemed more tedious, yet effectuell and certaine and tended withal to save the lives of their men. Wherefore they chused not a sudden storme on lower and weaker parts of the city, but rather to prepare the assault on the strongest side, yet most easy to their intention. For there only could they rayse the workes without the annoyance of the water-springs, that issued in the lower grounds ; there only could they make battery within pistoll shot of the walls, that wanted flankers; and when they had once entred a breach there, they were instantly possest of the highest part of the of the town”* (Corbet 1645, 46–47).

### **6.4.2 Analysis of Corbet's Account of the Defences of 1643**

The above information illustrates what appears to be a large circular work constructed to an insufficient standard encompassing the South Gate, the re-used Roman and medieval walls, the bastion at Rignall Stile, the East Gate, the Sallie (Postern) Gate (Rhodes 2014, 171, 173–175, 178), the North Gate (containing a small work on low ground) and a stone barn, Friars' Barn,

at Whitefriars (Rhodes 2014, 163–164, 178). The placement of this work appears significant, as it was said to command viewpoints in several different directions. These series of defences from the North to West Gates would have included Captain Singleton’s Sconce, Alvin Gate, the small scones, Chapple House, St Katherine’s Sconce and Dockham Bastion. Corbet notes the use of marshy ground, which illustrates that the defenders were conscious of utilising their surrounding low, difficult-to-navigate, landscape, as high ground was unavailable. The defensive line continued to include the Inner North Gate (the prison) (Rhodes 2014, 164) and on towards St Oswald’s.

The description continues from the West Gate and the site of The Pen fortification alongside the River Severn, meadows and the site of The Key towards the castle and bastion below it, encompassing the work at Barbican Hill and moving towards the South Gate (Rhodes 2014, 164). It appears that the “firme and lofty work to command the high ground in the suburbs” may have been the defences at the South Gate, as they appear to be the only feature in proximity located in and around the suburbs. Corbet notes that the surrounding ditches were small, but the defenders made use of the surrounding water (the river) by flooding the defensive ditches. Whilst the descriptions do not give any specific dimensions for the fortifications constructed, language such as “slender work upon a low ground” suggests that any fort constructed would not have satisfied the manuals of the period.

The evidence illustrates the amount of effort that was put into the construction of the defences, which was necessary because the Royalists were constructing their offensive works quicker. Corbet continues to state that the besieger’s battery required flankers. Rhodes (2014, 164) describes bastions as flankers or sconces, which suggests that the besiegers were, at some point, going to enhance and modify their battery. This also suggests that the battery was in the initial stages of its construction.

Rhodes (2014, 160) also suggests that the City Council’s Defence Committee had “pentagonal bastions, described as flankers or sconces on all sides except the east” (Rhodes 2014, 164). However, there are no descriptions of five-sided bastions or sconces being constructed. If this were the case, however, this would differ from the sconce containing four bastions in Ward (1639, 38) (**Figure 7**). Interestingly, Papillon (1645, 77) describes a flanker as a “bastard Bastion without Orillons” and that it was designed to “save charges, both in the erection of the works, and in the manning of the Garrisons”.

#### **6.4.3 Dorney’s Account of the Defences of 1643**

Gloucester Town Clerk John Dorney (1643, 214, 219) notes that on 13<sup>th</sup> August 1643:

*“we began the blocking up of the south port, making a damme of earth against the draw bridge, and a breast-work canon prooffe against the wall reaching from the draw bridge to the gate, and lining the houses on each side, and the almes-house between the gate and the draw-bridge with earth”*(Dorney 1643, 214).

Further additions to the defences were made on 23<sup>rd</sup> August 1643:

*“We employed ourselves in lyning the Fryar’s barne on the outside with earth for the preservation of our canon there, and in strengthening of our breastworks there, conceiving the enemy had intended a battery against it”* (Dorney 1643, 219).

Dorney (1643, 224) notes that on 3<sup>rd</sup> September 1643:

*“we began the lining of the houses over the east-gate, and the making of a very strong brest worke crosse the eastgate-streete, with a large trench before it, filled by some springs there, intending to raise it up to the eaves of the houses, and to plant some canon there. Wee also this day finished the sconce we began September 1, upon the mount in the garden by the Fryar’s orchard, where we could plant foure pieces of canon, to scour the Fryar’s orchard, and all along the eastgate”*.

On 5<sup>th</sup> September 1643, the people of Gloucester continued to construct the fortifications (Dorney 1643, 226), with even “maids and others wrought daily without the works in the little mead, in fetching turfe in the faces of our enemies” Dorney (1643, 227).

#### **6.4.4 Analysis of Dorney’s Account of the Defences of 1643**

The above information illustrates the continuation of the very basic defence work undertaken, largely in the form of excavating earth and lining current structures with it to prevent damage by cannon balls and entry by attackers. The lining of old structures with earth was criticised by Papillon (1645, 11–12). Dorney does mention continuing work on improving the fortification, in this case a breastwork, but does not illustrate any different approaches to its defence.

The information suggests that the sconce might have been small, as its construction only took place over three days. The description of positioning four cannons on the sconce may suggest that four complete bastions were constructed and that the fortification would have



represented a sconce as illustrated in the manuals of the period, for example that of Ward (1639, 38) (**Figure 7**). As previously discussed, the defensive operations continued to revolve around the excavation and placement of earth around houses and flooding any resulting trenches with water. Whilst basic, there is no evidence to suggest that the defenders could have done anything more or anything differently. The information illustrates that they continued to utilise the low-lying landscape in the best possible way by excavating deep to use the water table to their advantage by flooding their ditches to present another barrier to cross for any would-be attackers.

## 6.5 Cartographic Analysis of Gloucester

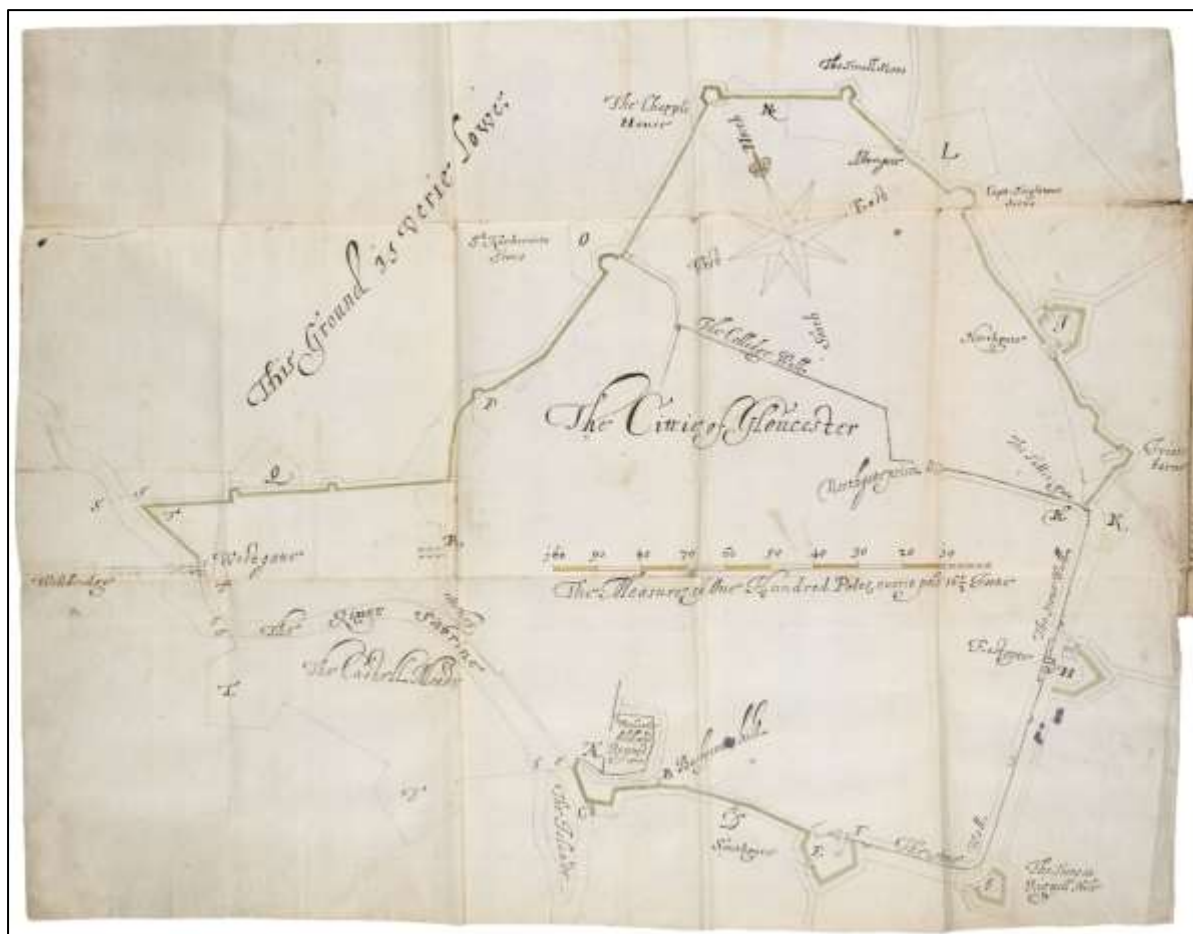
Speed's map of 1610 (**Figure 74**) illustrates a small cramped city, surrounded by flat arable and pasture land, with the River Severn dominating the south-western edge of the city. The medieval town wall appears to form two sides of a rectangle on the southern and eastern sections of the city, providing a clear boundary between cityscape and landscape, with the northern section now lost between the old city and the new suburb expanding to St Oswald's in the north and Whitefriars in the north-east. The plan does not depict any medieval wall on the western side of the city.



Figure 74: Speed's 1610 plan of Gloucester (Hawkyard 1988, 82) (image from different source utilised in Israel 2009, 20)

Speed's map of Gloucester should not be taken as a definitive record of what the city was like at the time. It has been noted that it illustrates the state of the city in the previous century and does not include additional features that Speed would have been aware of (Creighton and Higham 2005, 226). However, the map does illustrate that the city had expanded beyond its original boundary to the north, south and east (Day 2007, 39).

A plan recently discovered in 2012, D12862 (**Figure 75**) in the Gloucestershire Archives, contains important information on the defences constructed. This includes masonry walls, earthworks and ditches. The plan was drawn to scale and is within 7% of Ordnance Survey maps (Rhodes 2014, 159). With the inscription "This Ground is verie lowe" located to the north-west of the city, this demonstrates that the cartographer understood the importance that the topography would have had for any fortifications cited not only along that section of the defences but in an attempt to fortify the whole city. The following letters and titles are from Rhodes (2014, 170–184):



**Figure 75:** Plan D12862, illustrating the defences and plans for Gloucester (reproduced by permission of the Gloucestershire Archives)

#### A) The bastion under the castle

Corbet (1645, 52–53) describes the bastion as at August 1643 as a “breast-work upon Seavern side under the castle to defend an assault from those high grounds beyond the river”. No dimensions are given, and the feature is not present on Hall and Pinnell’s 1780 map (Rhodes 2014, 170). Plan D12862 demonstrates an acute angle and part of a bastion system. In addition, the castle is described as “Old and Ruyned”, suggesting another reason to construct a defensive feature at this position.

Corbet’s information suggests an appreciation of attempting to halt any attack from Royalist forces by attempting to slow their approach from the high ground. As the defenders did not control the “high grounds beyond the river”, the counter-approach was to construct a fortification on the controlled side to limit any potential success of an attack from that position.

#### B) Barbican (Barbycon) Hill

Dorney (1643, 218–219) recorded that on 21<sup>st</sup> August 1643, the cannon from “the Barbican upon the houses there” killed several soldiers and fired at a turnpike located in the upper section of Severn Street. Dorney (1643, 222) noted that on 30<sup>th</sup> August 1643, a demi-culverin was fired from Barbican Hill. The plan illustrates Barbican Hill as a T-shaped earthwork with a spur (Rhodes 2014, 170–171). A T-shaped feature appears to differ from the manuals of the period; therefore, if the map is accurate stylistically, it illustrates a new fortification style.

#### C) and D) Dams

Dams supported the city ditch (Rhodes 2014, 171). The construction of dams suggests an attempt to alter/stop the route of any water. This illustrates an understanding and appreciation of the immediate environs and perhaps a desire to divert water to provide an additional defensive position / create difficulty for any attacking army.

#### E) The South Gate

Positioned behind the city wall, this medieval gatehouse was repaired in 1642, using, amongst other items, 500 tiles, and needed complete repair after the 1643 siege (Rhodes 2014, 171). When Dorney (1643, 214) notes the “making a damme of earth against the draw bridge”, the drawbridge itself was positioned 10.5 m from the gate (Rhodes 2014, 172).

#### F) The stone wall

This wall was of Roman origin and survived the 1643 siege (Rhodes 2014, 173). This section of wall relates to the East Gate and the excavations of Gooseditch (discussed below) (Highway 1983; Rhodes 2014, 174).

#### G) The Sons (bastion) at Rignall Stile and the postern in an adjacent stone wall

This appears to have been a sally port, with a passage cut between the ramparts to allow access (Rhodes 2014, 174). This is mentioned as having been the site of a skirmish on 12<sup>th</sup> August 1643 by Dorney (1643, 213), who describes “a bridge of ladders over the moat” near a brick house at Rignall Stile. The placement and construction of a bastion at this site post-date the 1643 siege and illustrate further development of the defences after the conflict.

#### H) The East Gate

The East Gate (along with the South Gate) was “dammed up, and rammed with a thickness of earth cannon prooffe, and the walls on that side from port to port were lined to the battlements” (Corbet 1645, 46). Corbet (1645, 51) also recorded that the besiegers had decided to mine under the East Gate. The defenders responded by countermining in two areas, but “finding the springs, left off, conceiving for the same reason the endeavour of the enemy to no purpose” (Corbet 1645, 51). Dorney (1643, 226) notes that “We are perfected the lining of the houses over and by the east-gate”. This information suggests that miners hit the water table relatively early in their excavations and that the defenders were continuing to line structures with earth to protect them from artillery bombardment. The placement of a fortification at this site was an obvious necessity, as it covered a main gate into the city and, in turn, supply routes and communication lines.

#### I) The North Gate, labelled K2 (the Lower North Gate)

The locks on the North Gate were replaced by the city council in 1642–1643. When a drawbridge was completed in 1643, the gate and immediate houses were lined with earth. A bastion was constructed in February 1644 in front of the gate, with its eastern ditch revealed in excavations in 1982 to be 8m in width and 2.5 in depth. The west section of the bastion was constructed on the site of several houses, and one person was not required to pay rent because a house extension was destroyed to make room for the feature. Stone from the Vineyard and Brook Street (now Station Road), along with bricks, timber, tiles and other materials, were utilised to repair the gatehouse in 1645–1646 (Rhodes 2014, 179).

This evidence highlights the impact of the Civil War fortifications on the landscape of Gloucester. The destruction of houses in Gloucester would have displaced people and destroyed part of the very city that the Parliamentarians were trying to defend. However, in order for a bastion to be an effective fortification, a clear field of fire would have been required, hence the removal of the surrounding structures.

The rampart is described by Corbet (1645, 42) as a “small work newly raysed” in 1643, located on a medieval bank discovered by excavations in 2004–2005 (Rhodes 2014, 180). John Corbet (1645, 42) describes the defences of the North Gate as having a “slender work upon a low ground”. This work does appear to have been a bastion, as one was under construction in 1644.

Like at the East Gate, the placement of a fortification at the North Gate was an obvious necessity, as it would have covered a medieval gate and a major road in and out of the city. In addition, the gates would have been a permanent feature in the landscape, and, if in a reasonable condition, the fortification and the gate could have reinforced each other to co-ordinate their strengths whilst the former was under construction.

#### K) The Sallie Gate (also known as ‘Postern Gate’)

A postern was located in excavations conducted in 1971 of a stone wall. The postern was fortified with elm in 1642 and in 1643–1644 with stone from St Owen’s Church. The engineer Papillon described a stone tower in 1646 and proposed a projected bastion similar to the dotted lines on the plan (Rhodes 2014, 178).

#### K1) Friars’ Barn

Corbet (1645, 52) describes how “A sconce was built upon a rising ground that look into their trenches, where we could plant four piece of ordnance to cleare within the wals a ground called the Friar’s orchard southward, and secure their flank upon their entrance at the east gate, and so northward”. Dorney (1643, 215) states that enemy trenches were located to the east of Friars’ Orchard when there was a skirmish on 16<sup>th</sup> August 1643. Later, the enemy was entrenched between Friars’ Barn and Barton Street and within musket shot of the walls. The people continued to line houses with earth and attempted to strengthen the works around the barn. On 23<sup>rd</sup> August 1643, Dorney (1643, 219) reports that “We employed ourselves in lynning the Fryar’s barne on the outside with earth for the preservation of our canon there, and in strengthening of our breastworks there, conceiving the enemy had intended a battery against

it”. According to Rhodes (2014, 178), much of the earthwork was destroyed after the Civil War in 1662–1663 to make way for a road from the East Gate to the North Gate.

Corbet’s (1645, 52) description of “rising ground” explains the purpose of constructing a fortification at this location. As discussed, the landscape of and around Gloucester is very low; therefore, any high ground would have been an asset to be utilised to defend the city.

#### L) Captain Singleton’s Scons (e.g. bastion)

This bastion as depicted on the plan is today located beneath the frontages of Nos. 42–50 Worcester Street. The bastion was completed in 1643, with additional repairs between 1645 and 1647. The 1647 repairs were conducted to dam the River Twyver (brook), which was in the ditch in front of the bastion. Evidence of the course of the Twyver was discovered in excavations of 1983 (Rhodes 2014, 180). Atkin and Laughlin (1992, 71) note that the city’s ditches would have been required to have been cut, by hand, to a depth of 4m through lias clay, and the bank of the River Twyver (and marsh) would have been used to create the ramparts.

The fortification appears to have been constructed here to defend any approach towards the River Twyver. This evidence suggests that the site was chosen because of its location to guard the river.

#### L1) Alvin Gate

The gatehouse was repaired by the city council in 1642. In the Siege of 1643, it was a target of the besiegers; therefore, the council supplied bricks to strengthen the walls and a carpenter. The gate was blocked, presumably with earth, and the Twyver was scoured between 1649 and 1651 (Rhodes 2014, 181).

#### L2) The small scons

This and other ramparts were constructed in private gardens adjacent to St Catherine Street, previously known as ‘Watering Street’ (Rhodes 2014, 181), illustrating the impact that the construction of fortifications had on the landscape of Gloucester.

#### N) Chapple House

The bastion was completed in 1643 on what was once the medieval chapel of St Thomas. The city council repaired the site numerous times between 1644 and 1652, whilst the bastion was destroyed to make way for a road in 1653–1654. Today, the site is located between 28 Dean’s Walk and 7–15 Serlo Road (Rhodes 2014, 181).



#### O) St Katherine's Scons (e.g. bastion)

This bastion was located at the end of the priory precinct wall and was connected to the Sallie Gate (K), which formed an inner defensive line; the bastion was constructed between February and May 1643. Dockham Ditch, an old channel of the River Severn, was located immediately in front of the bastion. The engineer Papillon in 1646 recommended raising the bastion. The bastion was destroyed in 1653 by order of the city council, costing £2 (Rhodes 2014, 182). The map illustrates this bastion as being circular, not triangular, which would have been less effective than the bastion illustrated in **Figure 5**.

#### P) Dockham Bastion

On Dockham Ditch, a bastion was constructed; when is not known, although it probably did exist in 1643. The ditch itself was navigable in 1630, when stone was transported through it, and the ditch was recut in 1651 to allow for the construction of a timber yard. The bastion was still extant in April 1660 (Rhodes 2014, 164, 182).

The placement of this bastion and to some extent St Katherine's Scons was because of the proximity to the River Severn. This evidence suggests that the people of Gloucester placed great significance on controlling the river, as it was an essential element.

#### Q) The rampart behind St Bartholomew's Hospital

This rampart flanked a new ditch in Little Meade. The ditch was dammed after a council meeting on 15<sup>th</sup> May 1643, with the dam destroyed in 1661–1662 (Rhodes 2014, 183). The ditch of Little Mead is the same one that Dorney (1643, 227) describes: “maids and others wrought daily without the works in the little mead, in fetching turfe in the faces of our enemies” (Rhodes 2014, 164).

The evidence suggests the use of turf to cover a rampart. This appears to confirm the use of turf as part of a defensive feature, as suggested by Stone (1645, Plate 9, between pages 36–37) (**Figure 8**) and Norwood (1639, 93), for example.

#### R) Foreign Bridge

Two gaps, one being a flood arch between cutwaters. This section was dammed in 1642 to allow for a connection between Dockham Bastion and the rampart behind St Bartholomew's Hospital so that the low ground could be flooded (Rhodes 2014, 182–183). This evidence continues to demonstrate the effect that the construction of fortifications had on the landscape

of Gloucester. It also shows foresight in construction in having this section dammed so that a bastion and a rampart could be connected.

#### S) Chains across the River Severn

Chains to block the river were utilised until 1651–1652 (Rhodes 2014, 183). This evidence demonstrates that the besiegers utilised all their assets to defend the city, in this case blocking access to the River Severn. This demonstrates the importance of the river and controlling it as much as possible, in order to have a strategic and tactical foothold over the surrounding landscape.

#### T) The West Gate

On the north side of the gate was the earthwork in Pen Meadow, called ‘The Pen’. This was completed before the start of the 1643 siege and was active from between 10<sup>th</sup> August and 2<sup>nd</sup> September 1643 (Rhodes 2014, 184). Dorney (1643, 211) recorded that “Our canon...from the pen upon the west-gate, discharged upon the body of horse in Walham”. By February 1654, the earthwork had been dismantled (Rhodes 2014, 184).

By February 1644, a drawbridge was under constructed and had been paid for by the governor. In October, Parliament put forward money of £30; a further £17 completed the project for £47. It utilised lime, timber, iron, masonry and long spikes. In 1650–1651, the council used bricks to repair the masonry and renewed the drawbridge (Rhodes 2014, 184).

#### T1) The Key

The Key was protected by a guard post funded by the council in 1642–1643 (Rhodes 2014, 185). Corbet (1645, 52) recorded that “Upon the key head an halfe moon was raysed” in 1643. The plan depicts the site after the council had spent £78 on materials of iron, lead and stone from the Vineyard in 1644–1645 under the supervision of Samuel Baldwin. In August 1651, horses were used to draw timber to the site to create a breastwork on The Key (Rhodes 2014, 185).

The above information illustrates the central importance to the defence of Gloucester of the River Severn, hence the need to construct a half-moon at The Key. As there is no further information from Corbet giving dimensions for the half-moon, it can be suggested that it would have been similar to the illustration produced by Ward (1639, 48) (**Figure 12**) and made of earth at the time of the 1643 siege. The importance of the site is further demonstrated in the

enhancements made in 1644–1645 and again in 1651, when on both occasions’ materials were used to create a more permanent structure.

### **6.5.1 1:10,560 First-Edition Ordnance Survey Map**

Analysing the 1:10,560 First-Edition Ordnance Survey Map reveals very little evidence of the survival of any features relating to the English Civil War. For example, there is no evidence of the Alney Island earthworks. There is also no evidence of The Pen, Dockham Bastion, St Katherine’s Sconce, Alvin Gate, Captain Singleton’s Sconce and the North Gate, whilst the site of Whitefriars Barn was the site of a cattle market. The site name of ‘Friars’ Orchard’ is recorded; however, this presumably relates to the historic friary. The fortification at the South Gate is not noted, and neither are the defensive positions of Barbican Hill and the bastion under the castle. The castle itself is also not a noted cartographic feature. The only feature relating to the Civil War depicted on the map lies outside the city at the Vineyard, with the moat and earthwork illustrated. Overall, the 1:10,560 First-Edition Ordnance Survey Map demonstrates little evidence for any survival of Civil War features and/or sites.

### **6.5.2 Additional Sources**

Aside from the recent discovery of Plan D12862, the earliest plan of the defences of Gloucester is the 1780 Hall and Pinnell map (Atkin and Howes 1993, 18), with a published version dated 1786 (**Figure 76**). Atkin (1993, 151) illustrates the line separately to the internal dynamics of the city (**Figure 77**). In 1819, Fosbrooke reproduced the Hall and Pinnell map (**Figure 78**). The plan illustrates a small but spacious city, like Speed’s map before it, and crucially does not include the surrounding destroyed suburbs.

The Hall and Pinnell map is based on plans for the defences of Gloucester after the siege and what could/should have been constructed at a later date (Atkin and Howes 1993, 38).

The “‘Lines of Fortifications’ (themselves undated) shows an elaborate circuit of double ditches and bastions” (Atkin and Howes 1993, 19). The map also illustrates evidence of additional lines of bastions inside the city to the south-east of The Pen, defending a further point of the River Severn.

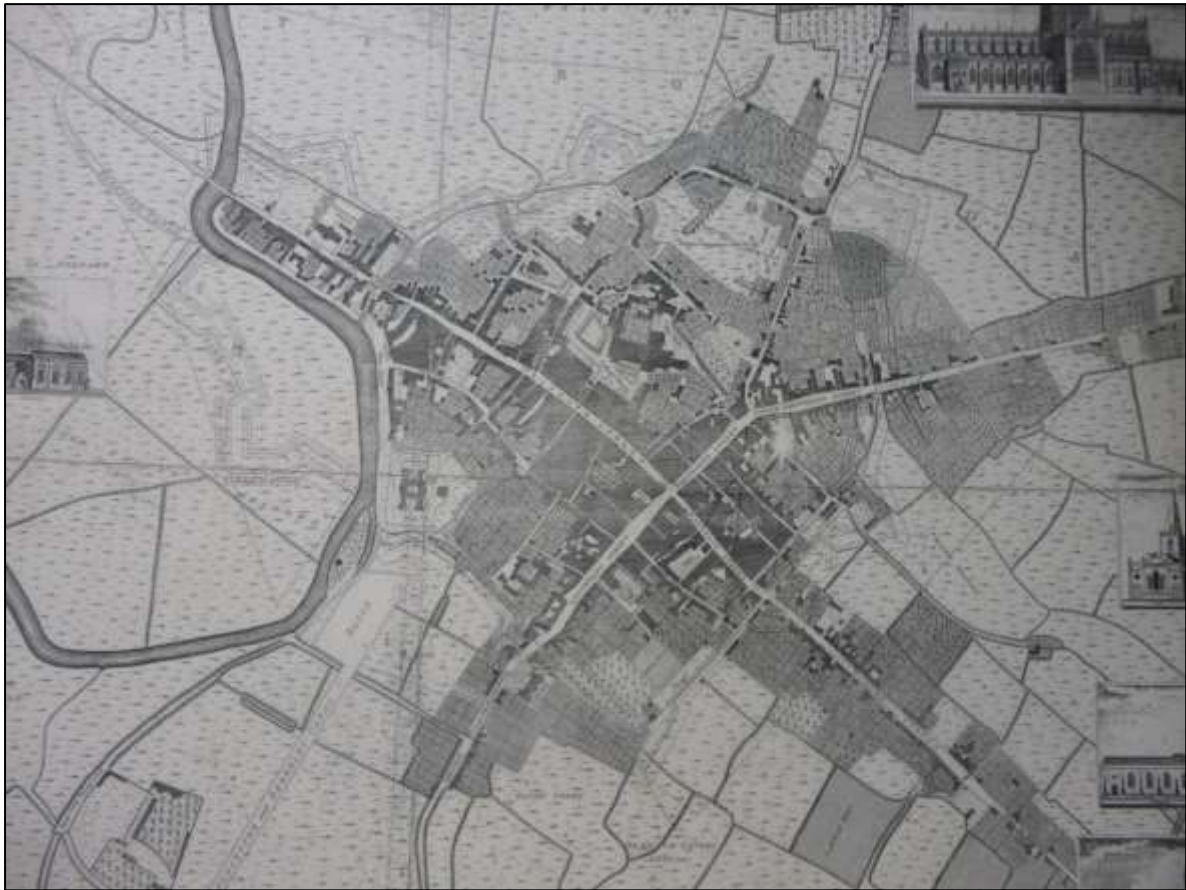


Figure 76: 1786 version of the Hall and Pinnell plan of the city of Gloucester (Gloucestershire Archives: PC 1769 4-61-1 3)

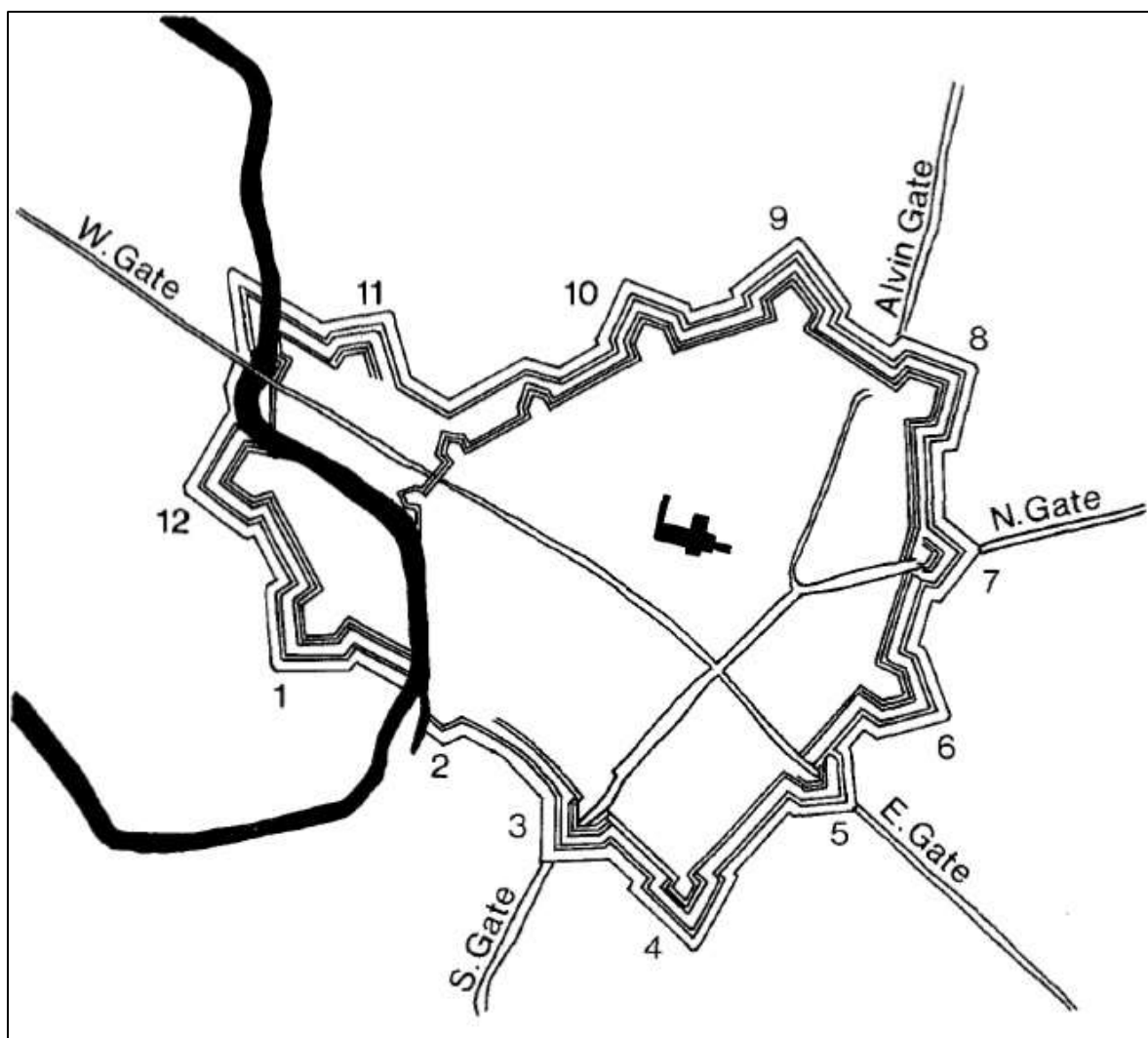


Figure 77: Extracted lines of fortifications of Gloucester (Atkin 1993, 151)

The plans demonstrate a convoluted scheme of defensive works. Double ditches and bastion faces are, at first glance, arguably excessive to defend any city, not just Gloucester. The potential unnecessary features are the two bastions numbered 1 and 12 on **Figure 77**, as the River Sever could have potentially provided the necessary defence, as had been seen at Oxford, with the city utilising the rivers Cherwell and Isis in its defensive plan (Barratt 2015, 74). However, given Sir William Waller crossing on a bridge of boats in March 1643 on the River Sever (Atkin and Laughlin 1992, 29) and the Royalist crossing at Tewkesbury in 1643 by Prince Maurice, in addition to a further crossing by Waller at Framilode and Edward Whalley's crossing at the Siege of Worcester on 1646 (Atkin 2008, 64–65), it does suggest that the river was potentially thought of as a weakness that needed reinforcement.



Figure 78: Fosbrooke's version of the defences of Gloucester (Fosbrooke 1819, figure between viii-ix)

Washborn's (1825) plan (**Figure 79**) is based on the accounts of Corbet and Dorney of the 1643 Siege of Gloucester (Atkin and Howes 1993, 19). This plan demonstrates the locations of the various fortifications that would have been present at the time of the 1643 siege, including Alvin Gate, the Lower North Gate, the South Gate and the West Gate, with The Pen referred to as one of a number of works. It illustrates the compact nature of the city and the proximity of the fortifications to each other. Although simplistic, the plan also shows the key Royalist artillery position of Gaudy Green. The plan does not illustrate the Alney Island sconces, although this can be explained by the fact that the island was strictly outside the main defences.



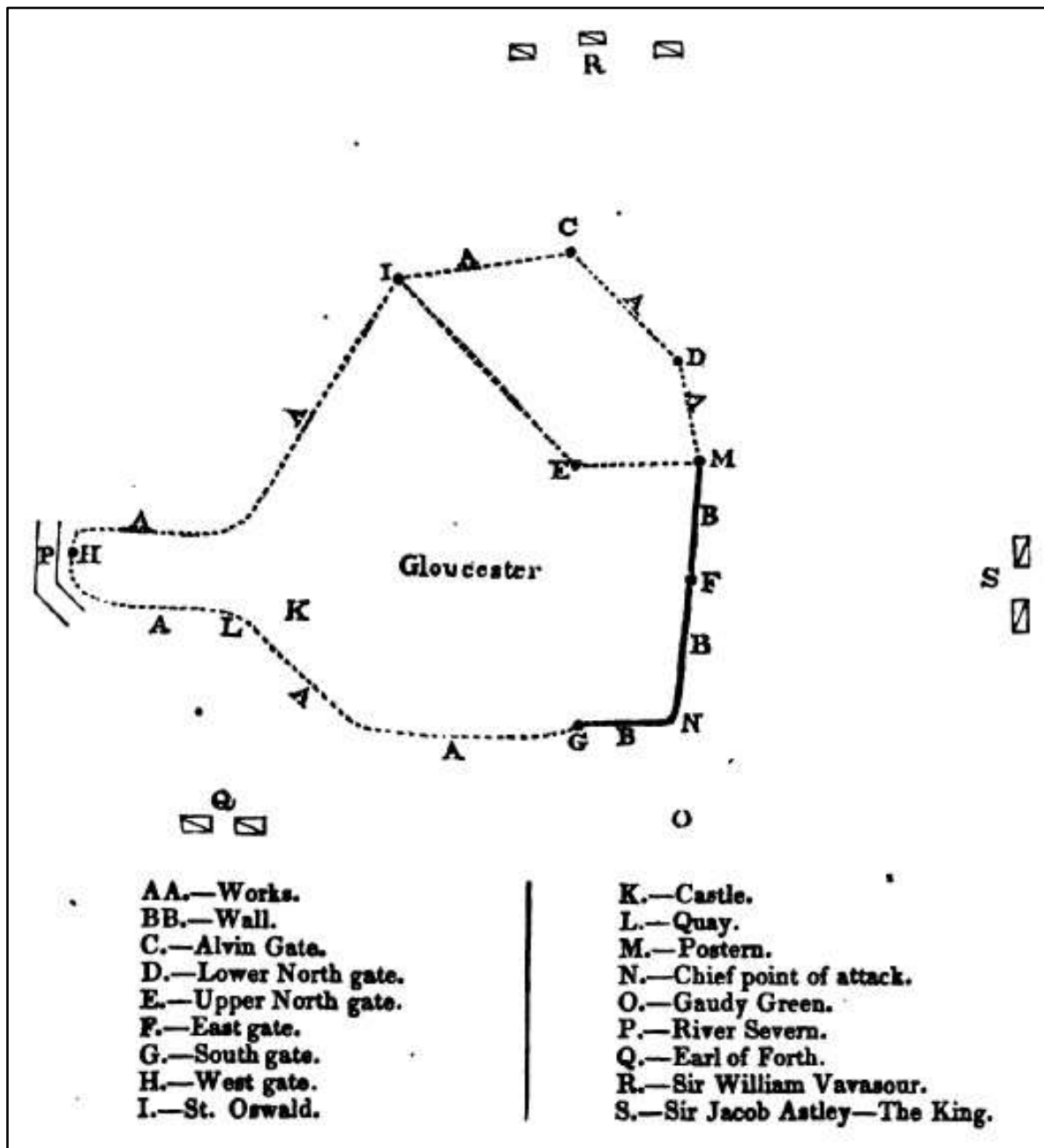


Figure 79: Washborn's plan of the defences of Gloucester, based on the accounts of Corbet and Dorney (Washborn 1825, lviii)

A further plan (Figure 80) of 1643 was produced by Atkin and Howes (1993, 16). This plan shows in more detail the fortifications constructed throughout and outside the city. Again, like Washborn's plan, it ignores the sconces on Alney Island. The plan does demonstrate the connection of the fortifications and the road networks in and out of the city. The construction of fortifications at the West Gate, the South Gate, the East Gate and the Outer North Gate demonstrates that it was necessary to control the main lines of communication and supply. On land, these were Northgate Street, Eastgate Street, Southgate Street and Westgate Street. In

addition, protecting one of Gloucester's main supply routes, the River Severn, was covered by the fortifications at the West Gate and The Pen, along with defences at The Key and a bastion constructed under the castle.

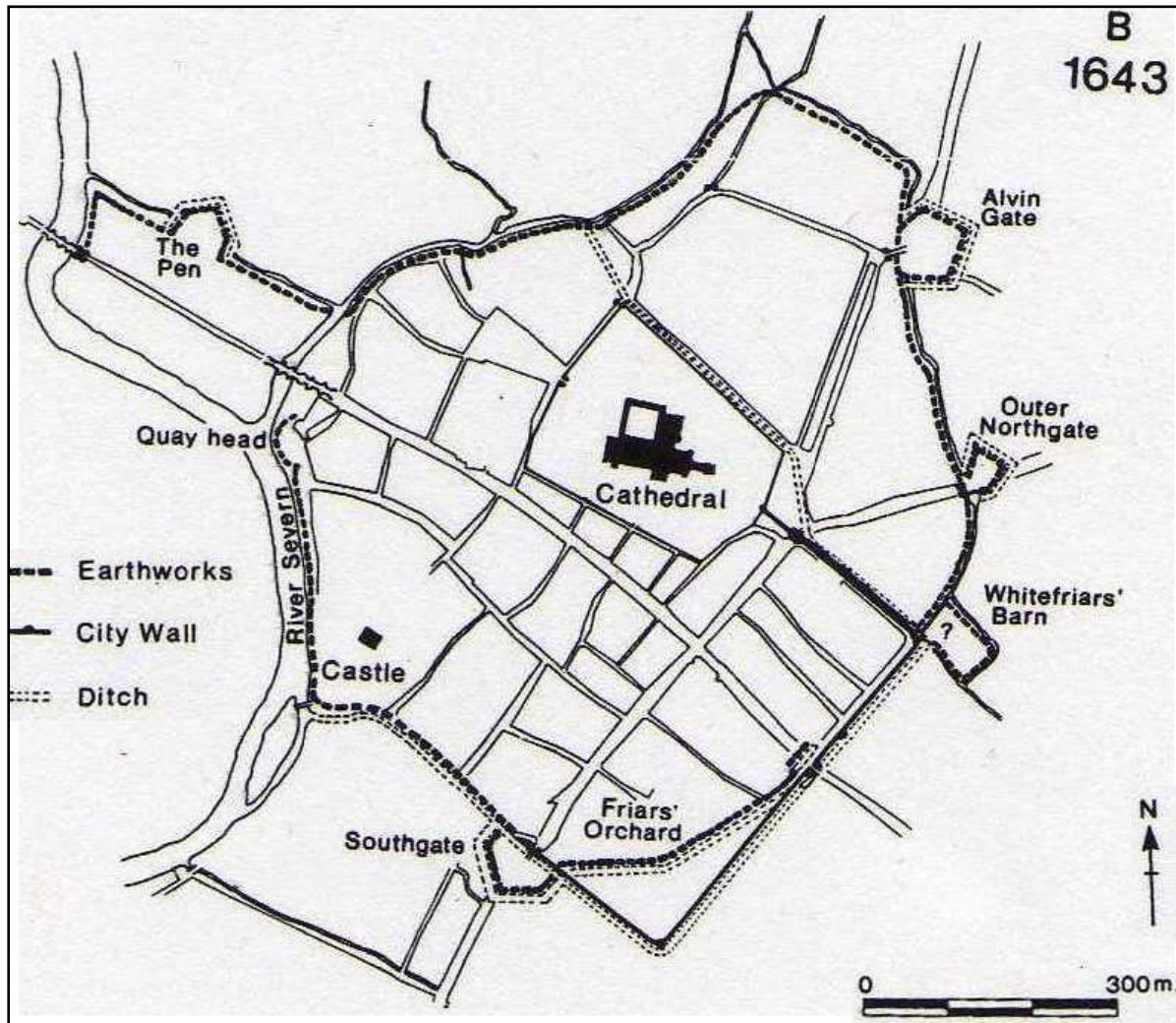


Figure 80: The defences of Gloucester in 1643 (Atkin and Howes 1993, 16, as cited in Israel 2009, 32)

A 2007 map (**Figure 81**) based on the plan of Atkin and Howes (1993, 16) illustrates the same defensive locations, although with subtle differences. The northern section of the defences north-west of Alvin Gate has a more prominent triangular protrusion. Regarding the fortification at Whitefriars Barn, instead of a rectangular feature at a 45° angle, as on Atkin and Howes' (1993, 16) plan (which is denoted with a '?'), the feature is of similar design but much smaller in shape and closer to the medieval wall. The placement of the Alney Island sconces illustrates an attempt to protect that vital source of supply and communication.

Royalist artillery positions are also indicated, illustrating five distinct positions. The first at Gaudy Green appears to be positioned to attack the medieval (and Roman) wall to the north and the defences at the South Gate. The second position appears to focus on the medieval wall and on the East Gate. The third position focuses on the East Gate. The fourth position appears to focus on Alvin Gate, with the fifth position in front of Vavasour's Camp.

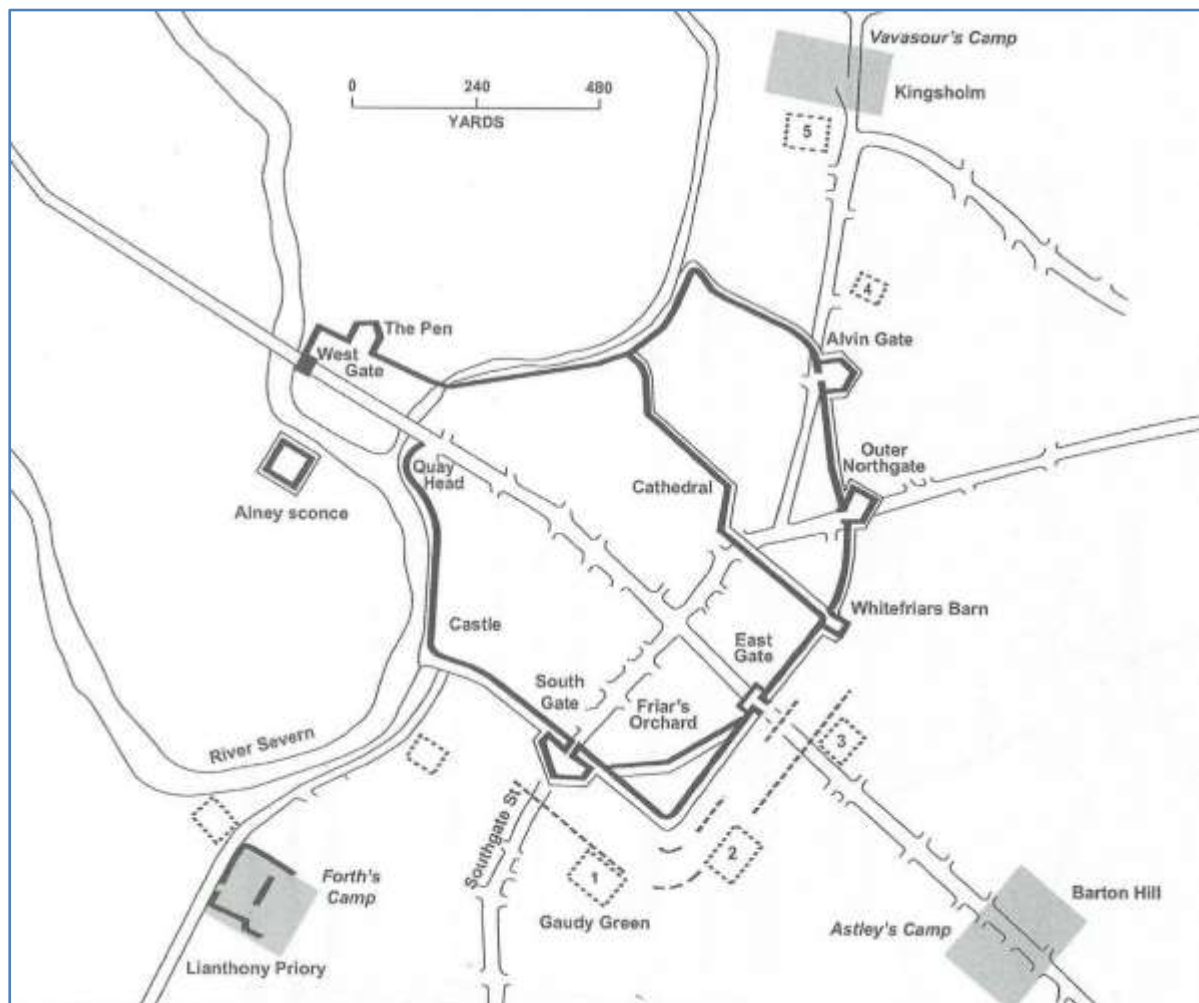


Figure 81: The fortifications of Gloucester and besiegers' artillery positions in 1643 (Day 2007, Map 2)

Comparing the plans of D12862 (**Figure 75**), Hall and Pinnell (**Figures 76 and 77**), Fosbrooke (**Figure 78**), Washborn (**Figure 79**), Atkin and Howes (**Figure 80**) and Day (**Figure 81**) illustrates some differences in the plans regarding the defences. The plans of Atkin and Howes and Day may require additions, based on the evidence of Plan D12862.

The first is the location of The Pen defences. Plan D12862 has its location the same as Atkin and Howes and Day. Fosbrooke, like Hall and Pinnell, shows that the fortification ends east of the River Sever.

Heading north-east, the defensive line on D12862 passes the inner work of Dockham Bastion (P) and St Katherine's Scons (bastion) (O) towards Chapple House. Washborn indicates evidence of a fortification at Chapple House, with 'A' referencing a work. There is no evidence on his plan for specific bastions at Dockham and St Katherine's. The Hall and Pinnell and Fosbrooke plans indicate fortifications at these locations. Neither Atkin and Howes' plan nor Day's indicate any specific bastions along this section of the defensive line.

Plan D12862 shows the defensive line moving in a small curve to the east feature described as the 'Small Scons'. A fortification is depicted on Fosbrooke's and Hall and Pinnell's plans; no fortification is depicted on the plans by Washborn, Atkin and Howes or by Day. This illustrates a difference of opinion regarding the exact course of the defensive line. The Fosbrooke and Hall and Pinnell plans place the line heading a short distance farther north.

The bastion of Captain Singleton is the next area of contention, as the defensive line moves past Alvin Gate. Whilst Plan D12862 illustrates this, all the other plans do not. The explanation regarding the plans of Fosbrooke and Hall and Pinnell is that the maps follow Papillon's plan of 16<sup>th</sup> July 1646, who stated in point 8 that he would destroy Captain Singleton's Sconce (Atkin 1993, 163).

The bastions/sconces at the Outer North Gate and Whitefriars Barn are denoted on each plan, with stylistic differences (apart from Washborn, who denotes no specific features). The Atkin and Howes and Day plans show the same Outer North Gate. Plan D12862 and the plans of Fosbrooke and Hall and Pinnell illustrate a bastion feature, although with a less acute northern flank connecting the bastion to the defensive line.

The work of Whitefriars Barn is noted on all plans, except Washborn's. This explains the '?' on Atkin and Howes' plan. A bastion feature is demonstrated on the Fosbrooke and Hall and Pinnell plans. However, what the original design of Whitefriars Barn consisted of is open to interpretation, especially considering Papillon's statement at point 6 that "the old barn and the workes of it, is to be deserted" (Atkin 1993, 163) and replaced by a curtain wall.

The next fortification is the bastion at the East Gate. This is recognised on all the plans. Continuing south, utilising the old medieval/Roman wall, on Plan D12862 is the sconce at Rignall Stile. This is shown on the Hall and Pinnell and Fosbrooke plans but not on the plans of Washborn, Atkin and Howes, and Day. This suggests that the sconce (bastion) at Rignall Stile post-dates the 1643 siege. Indeed, Washborn notes that this was the "Chief point of attack". At the end, the medieval wall turns in a north-western direction to the bastion at the South Gate. The location of a bastion at the South Gate is shown on all the plans.

The continuation of the defensive line heading west to north-west towards the site of Gloucester Castle is illustrated on all the plans. Plan D12862 notes a bastion under the castle and an earthwork at Barbican Hill. Fosbrooke's plan shows the defensive line continuing in this direction and illustrates a demi-bastion near the site of Barbican Hill. Washborn's plan denotes two works along this line, which may be represented on Plan D12862 at 'D' – a damn "impounding the city ditch" (Rhodes 2014, 171) – and then an additional one south of the castle, which may represent the earthwork at Barbican Hill. The plans of Atkin and Howes and Day show the continuation of the defensive line and denote the location of the castle.

The defensive line continues on Plan D12862 heading north-west towards The Quay, appearing on the map as 'The Key'. At this point, the plans of Atkin and Howes and Day end the defensive line at Quay Head. The plans of Hall and Pinnell and Fosbrooke continue north-north-east and include the bastion at Dockham, which itself rejoins the main circuit. Washborn's plan denotes the quay and heads in a westerly direction (with a further work), terminating at the West Gate (The Pen?) fortification to form a complete defensive circuit.

To the south of the River Severn in the area known as 'Castle Mead', Plan D12862 denotes two bastions, as do the plans of Hall and Pinnell and Fosbrooke, with minor differences in their exact locations. These bastions are not demonstrated on the plans of Washborn, Atkin and Howes, and Day. The plan of Day is the only one that refers to the sconces on Alney Island.

Overall analysis of the cartographic evidence demonstrates that the placement of the fortifications was designed to cover the main roads in and out of the city. The several fortifications sited to cover the River Severn demonstrate its significance as a defensible feature and useful asset. An additional inner line of defence is present on Plan D12862 and on the plans of Atkin and Howes and Day. However, the main fortifications around the city were constructed on the limited higher ground available and were closely sited to be able to cover each other with enfilading fire.

## 6.6 Archaeological Evidence of Gloucester

### 6.6.1 Eastgate

Excavations at 38–44 Eastgate Street revealed little evidence of the 1643 siege (Heighway 1983, 9, 41). Context (11A3 – described as Civil War debris *c.* 1643) revealed evidence of a cannon ball for a culverin artillery piece, which was recovered along with window glass, tiles, stone debris and lead, illustrating some evidence of a bombardment. Sections 305 and 320 (**Figure 82**) illustrate evidence of destruction in the form of building debris from the 13<sup>th</sup>-century Eastgate Tower (Heighway 1983, 60, 203, 255). Crucially, this evidence reveals that the city was being bombarded by culverin artillery and that the besieged were re-using medieval structures as significant features to defend their positions.

Context (11F1) was a recut of the city ditch, and Context (11F2) contained late 17<sup>th</sup>-century backfill of (11F1), which revealed that Gooseditch (**Figure 83**) was recut during the Civil War to stop it flooding. **Figure 83** also illustrates a Civil War breach, which may be Context (11E), which was a ditch cut of west–east orientation around 1640 to drain the ditch (Heighway 1983, 61, 255). The evidence of recutting a ditch to remove running water is tactically and strategically interesting, as some authors of the period suggested flooding a ditch to provide a tactical advantage. Presumably, a flooded ditch would make mining more difficult for the besiegers. However, the evidence of making a breach/cut into the ditch to drain it suggests that the area was prone to flooding and caused more problems to the surrounding features, such as the Horse Pool and the medieval tower/wall. Interestingly outworks, such as the two sconces on Alney Island, were positioned in areas that could have flooded – illustrating the complete understanding of the besieged of their landscape.



# 38-44 EASTGATE STREET GLOUCESTER 1974

Sections against medieval tower

SECTION 305 (above)  
SECTION 320 (below)

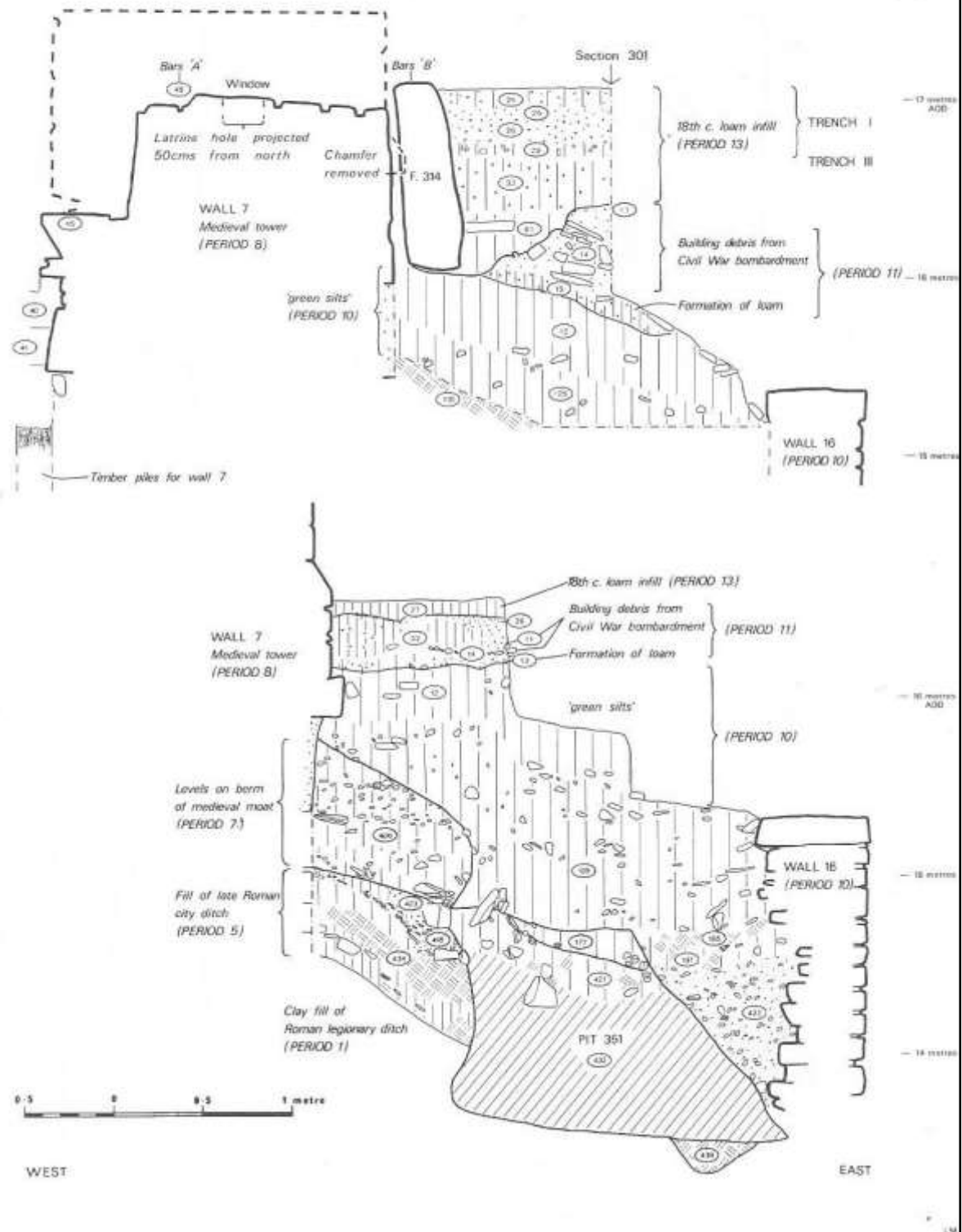


Figure 82: Civil War bombardment on a medieval tower (Heighway 1983, Figure 49, page 68)

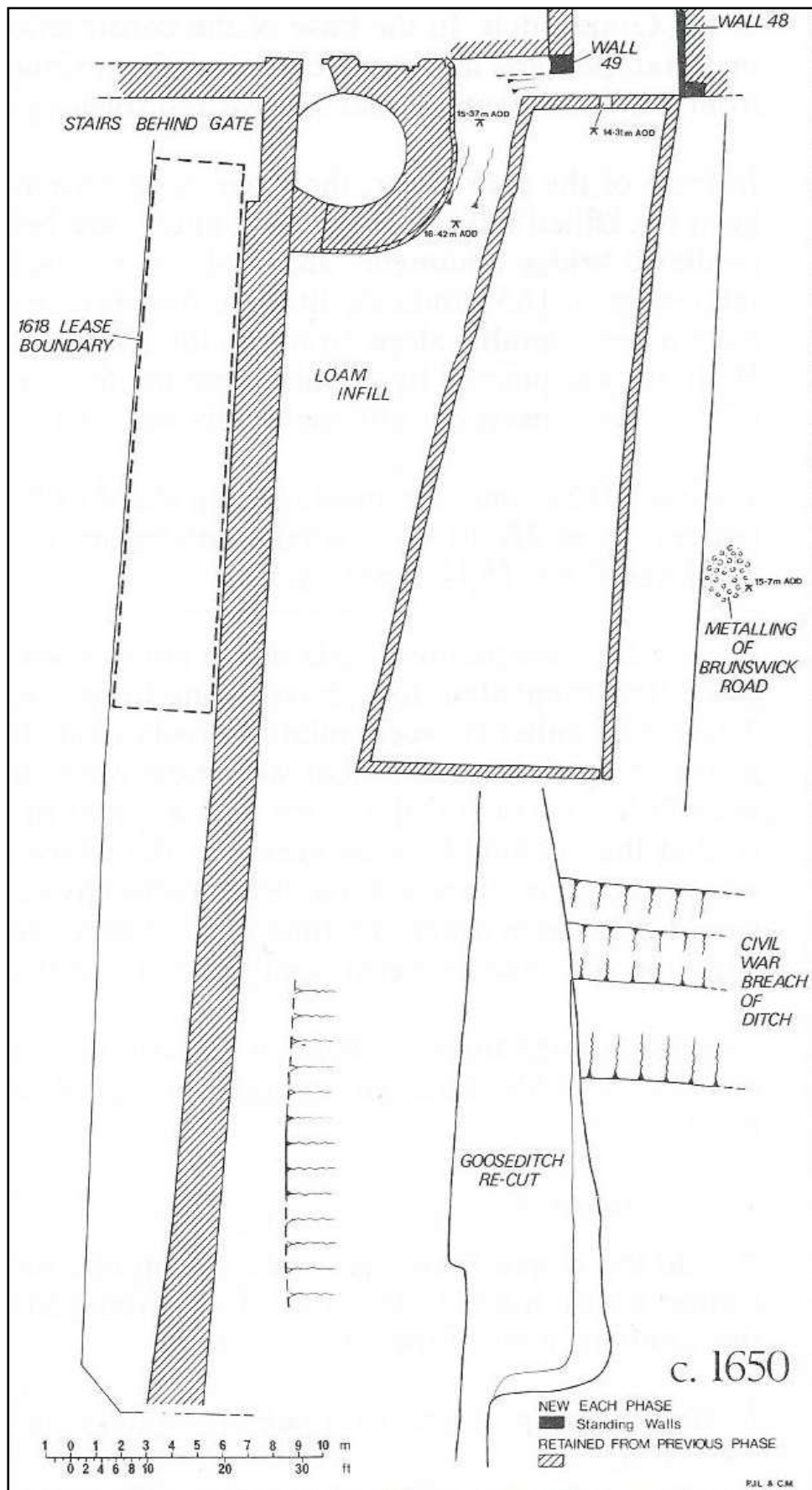
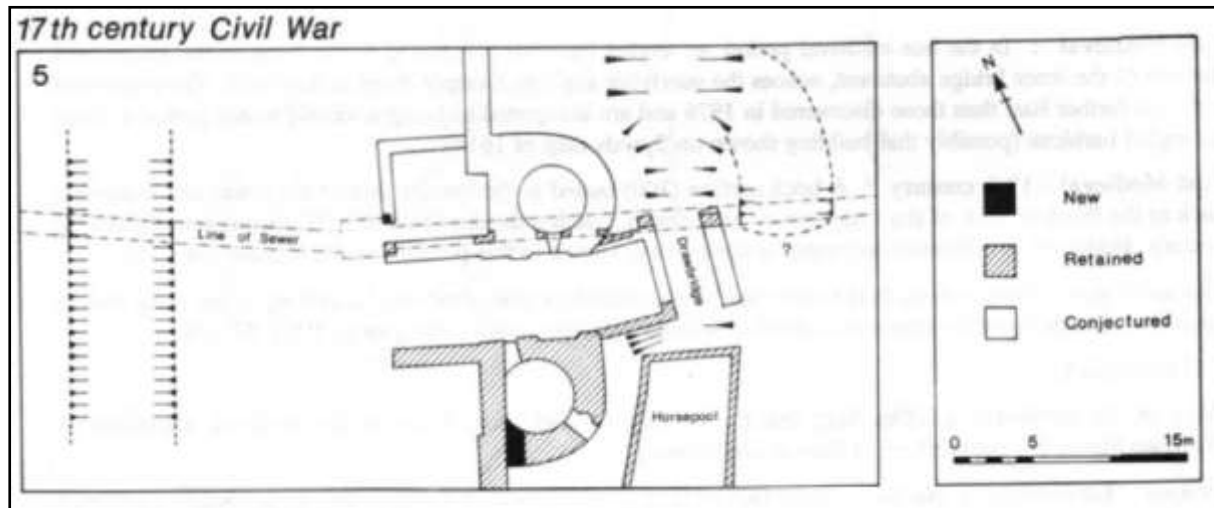


Figure 83: Civil recutting of Gooseditch and breach of ditch (Heighway 1983, Figure 40, page 60) (image from different source utilised in Israel 2009, 33)

Linked to the earlier excavations of Heighway (1983, 61, 255) and the recutting of Gooseditch, the Horse Pool, Greatorex (1991, 27) also focused on this area of the South Gate. **Figure 84** illustrates an addition to the southern tower, completing its fitting to the medieval town wall.



**Figure 84: Civil War Additions** (Extract of Greatorex 1991, 28)

The excavations revealed a soft brown loam, which was different to other material on the site, suggesting that this deposit of soil was imported from elsewhere in the city or farther afield. A further area some 20m inside the city wall, which contained backfill evidence, was determined to be a ditch of a breastwork fortification constructed at the time of the 1643 siege (Greatorex 1991, 29). Atkin and Laughlin (1992, 62) give the dimensions of the feature as irregular in profile: 7m in width and 3m in depth. This reveals significant information and may be indicative of the ‘last ditch’ of defences constructed *inside* the city walls.

Whilst the dimensions of the ditch do not correspond with the manuals of the period, having widths of 42.67m (Norwood 1639, 112) and 45m (Ward 1639, 60), considering that it was a final ‘last ditch’, it can be argued that it was never meant to.

### 6.6.2 The South Gate

Excavations at 106 Southgate Street in 1983 revealed evidence of a Civil War ditch that destroyed many medieval buildings and left poor stratigraphy of the period. A comparison of the evidence with Speed’s map of 1610 demonstrated that many tenements on the site were cleared during the war (Yuill 1983?, 23-26).

In Trench II, the ditch (Context (366)) contained several contexts, with two containing burnt twigs and another with evidence of latticework or straw (Yuill 1983?, 27). The evidence of burnt twigs may relate to the positioning of gabions to defend artillery positions. Historical documentation explains that several buildings, including St Owen's Church, were destroyed to make way for the ditch (Yuill 1983?, 28). This evidence continues to demonstrate the effect that the Civil War had on the landscape of Gloucester.

In Trenches I and II, two makeshift walls were discovered inside a cellar; Contexts (186) (on the northern cellar wall) and (195) (on the southern) were made of brick, stone tiles and lias blocks (186), bonded together with mortar. As suggested by Yuill (1983?, 28) the walls might have been an attempt to stabilise the cellar walls to stop them from collapsing after excavating the ditch.

The ditch (366) (**Figure 85**) ran from south-east to north-west of the site and curved to the east in the northern section of Trench I. The ditch was V-shaped, 5.5m across, 2.3m deep and cut into the natural geology. The east section of the ditch was steeper than the west and appeared to have been of better quality. The east section contained a large section of ashlar masonry (Context (385)) embedded in the ditch. The masonry formed a series of stepped courses to the bank, which could have been a gun emplacement or bridge abutment. It is suggested that the masonry came from the destruction of St Owen's Church. The last fill of the ditch (Context (298)) was a dense black silty clay layer, which was waterlogged – immediately below this layer, the water table was located at c. 13.85m aOD. Artefactual evidence suggests that the ditch was gradually refilled with soil or rubble, rather than a concentrated effort to restore the medieval height of the landscape (Yuill 1983?, 29–31). The evidence of step courses could indicate a fire step, like the one excavated in Taunton. If correct, this illustrates an attempt to construct a banquette (**Figure 12**) and conforms to the theoretical paradigms of the period.

The excavations at the South Gate demonstrated the ditch on the outer defences as illustrated on the Hall and Pinnell plan but found no evidence of a counterscarp or rampart (Atkin and Howes 1993, 26).

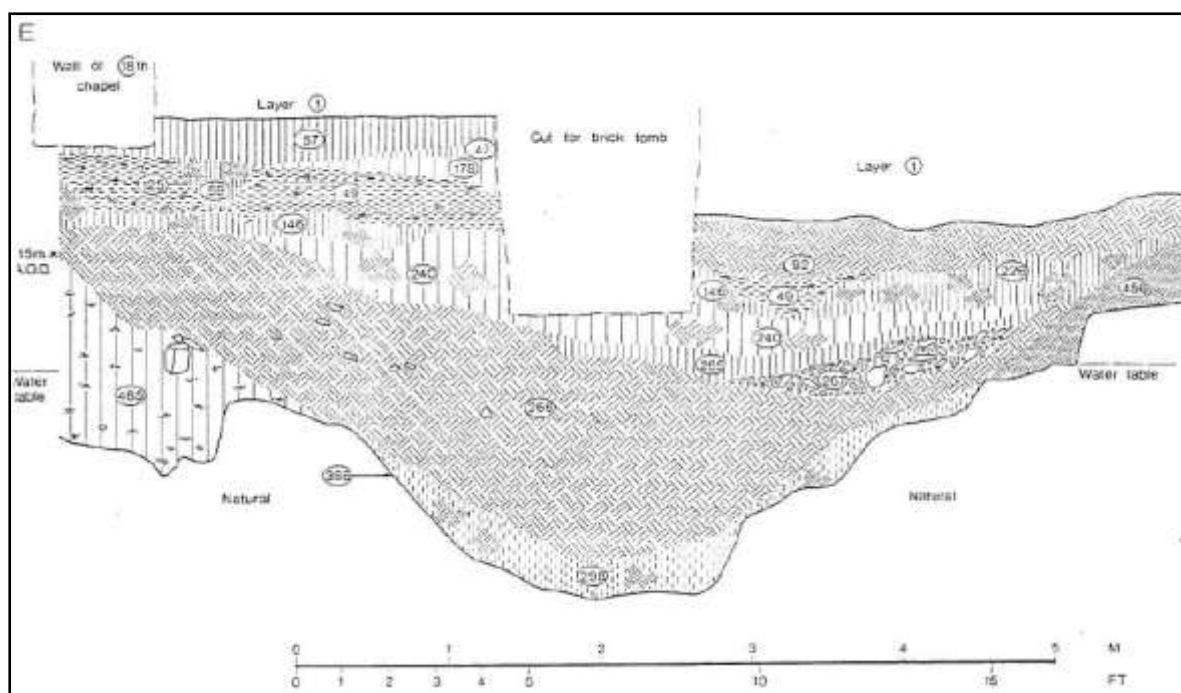


Figure 85: The Civil War ditch in Trench 1 (Yuill 1983?, Figure 14) (image from different source utilised in Israel 2009, 36)

Excavations in 1988 at the Bank of England site on Southgate Street (**Figure 86**) revealed the destruction of a medieval building, with a 3cm burnt layer and a clay pipe dating to 1640–1660. Atkin dates the event of the destruction to 10<sup>th</sup> August 1643, when the citizens consciously burnt the suburbs to prevent attacking Royalists from using the buildings as cover. In total, 241 buildings were destroyed, including St Owen’s Church (Atkin 1988, 10–11; 1988a, 11). **Figure 86** also demonstrates the two faces of a bastion and a flank towards the medieval wall whilst also illustrating the number of houses that were destroyed to provide a field of fire for the besieged. The destruction of so much property and the displacement of people and industries demonstrate that the construction of the fortifications had an immense impact on the landscape of Gloucester.

A 1m x 1m, flat-bottomed, regular-cut, steep-sided ditch also revealed tip lines of clay on the northern section, indicating the possibility of a bank on that site. Whilst only one post-medieval sherd of pottery was recovered from the ditch, it may date to the Siege of 1643, and the ditch’s form appears to be similar to a Royalist sap (**Figure 87**) (Atkin 1988, 11; Atkin 1988a 11). Saps were small features dug in a zigzag pattern for attacks and to drain a ditch of water (Atkin 1988a, 11); in addition, they had a role in attempting to damage Parliamentary resistance psychologically. From their form, saps were in essence like Second World War communication/fire trenches.

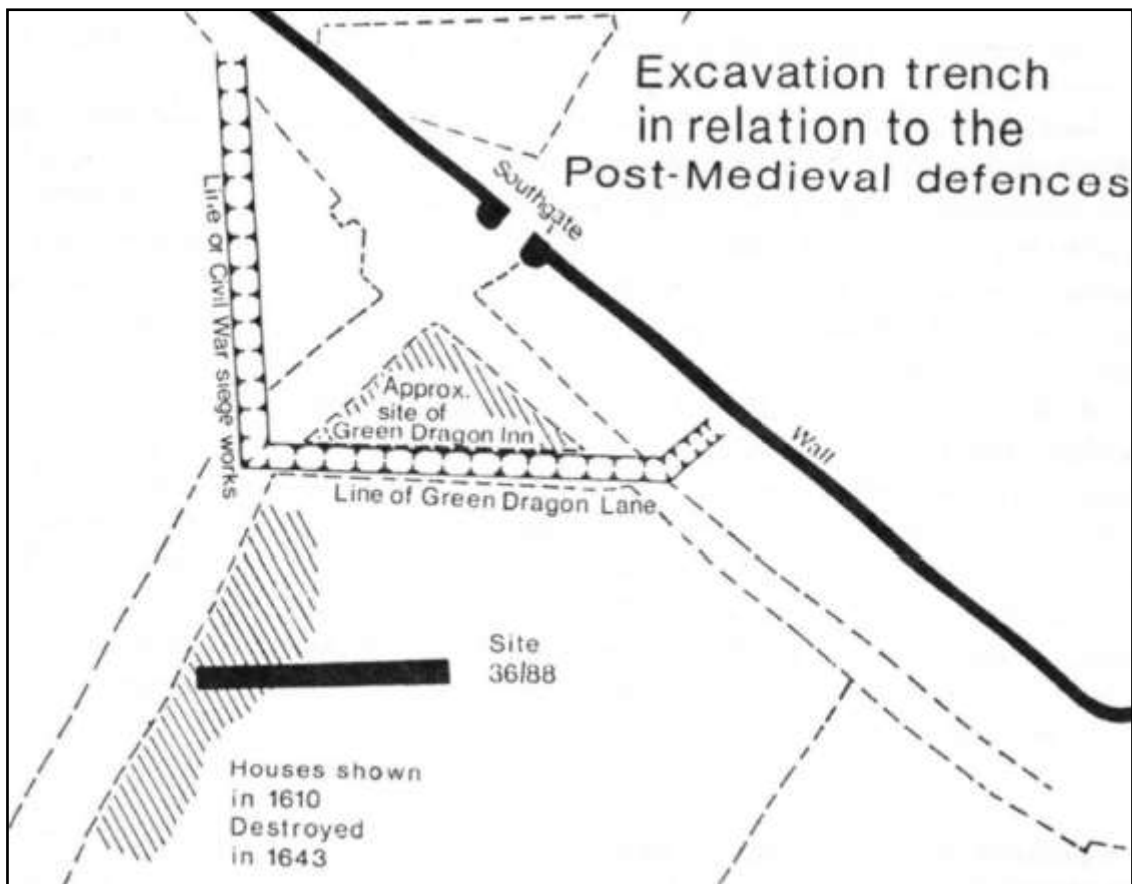
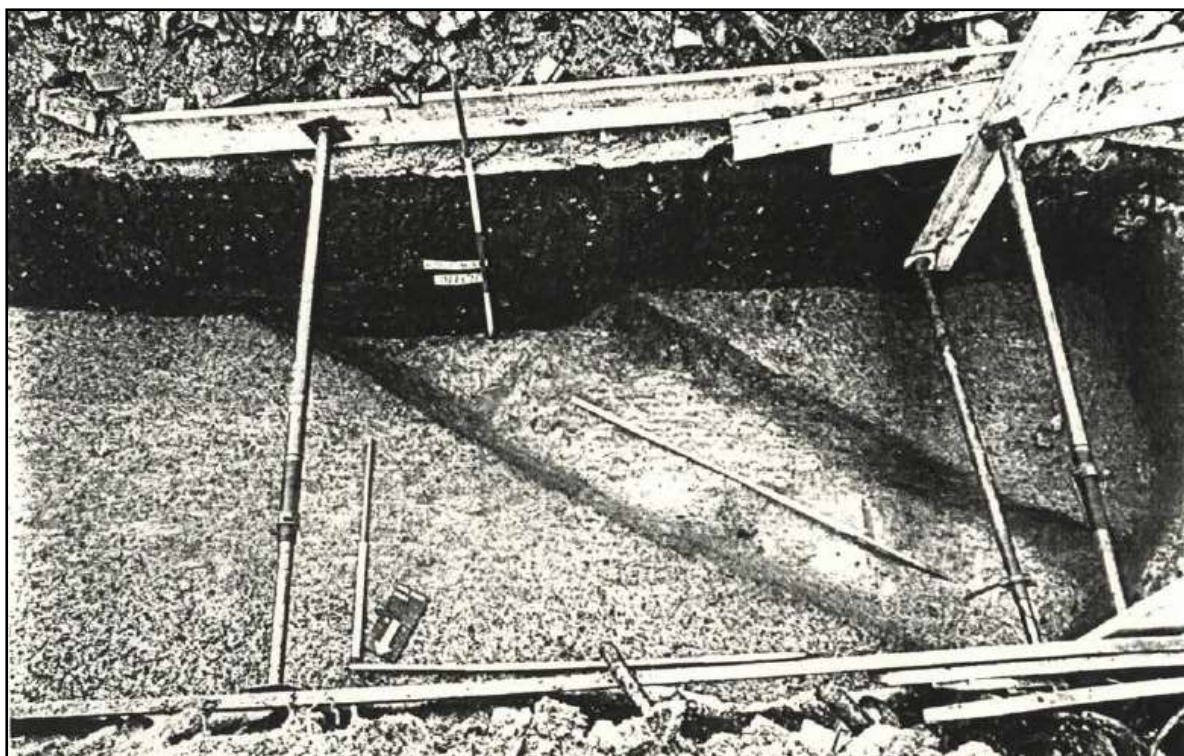


Figure 86: The Civil War Ditch in Trench 1 (Extract of Atkin 1988, Figure 2, page 4)





**Figure 87: The possible Royalist Civil War sap (Atkin 1988, Plate 6, page 27)**

Further excavations at the Bank of England site (36/88) revealed that the ditch was *c.* 10m in width and 4m in depth and was the length of the former road Green Dragon Lane (Atkin 1990, 3).

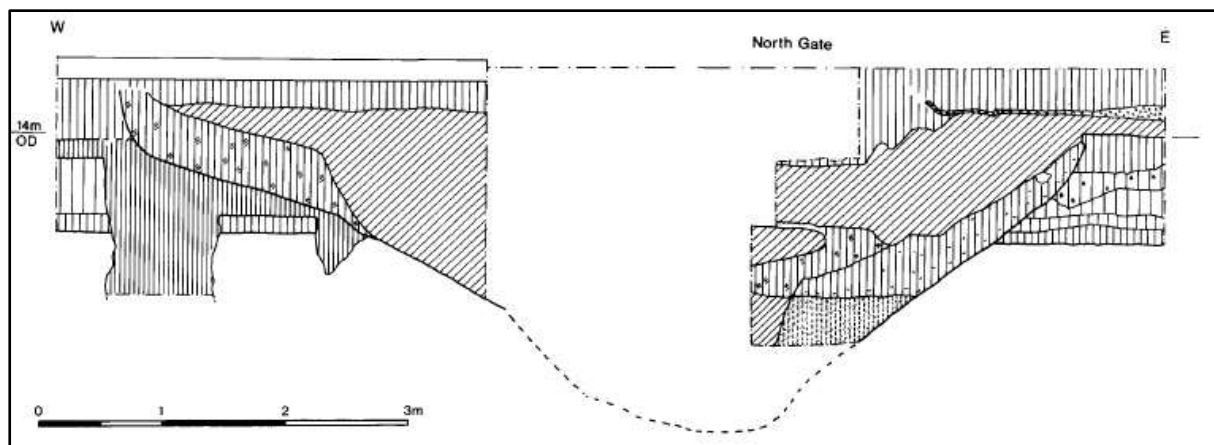
The Southgate Gallery site (3/89) revealed evidence of further destruction of property to the south and west sides of Southgate Street. A small tannery was constructed on the site, appearing to respect the line of the ditch, suggesting that the ditch was not backfilled immediately after the end of the Civil War (Atkin 1990, 3, 7; Atkin and Laughlin 1992, 66). The results appear to confirm the cartographic evidence in Hall and Pinnell's plan of 1780, with a "fossilisation of the line of the triangular salient on the west...may be a pointer to the location of the wartime entrance through the defences" (Atkin 1990, 7). Other excavations in Exeter have revealed similar features (Atkin 1990, 3, 7).

### **6.6.3 The North Gate**

An HER entry for 1982 recorded that excavations revealed a "large out defences ditch...8 m wide ditch was back-filled with Lias clay above silting levels, exceeding 1800 m/m deep" (Garrod 1982).

Corbet (1645, 42) describes the defences of the North Gate as having a “slender work upon a low ground”. As Atkin and Howes (1993, 24) note, the “‘slender work’ running from the Almesham Postern to the Outer North Gate was probably formed on the basis of the King’s Ditch. The latter then joined the outer leg of the River Twyver or King’s Water which ran towards the Alvin Gate”; this evidence shows how the people of Gloucester utilised the natural landscape to their advantage when constructing defences. According to Rhodes (2014, 179), the work appears to have been a bastion that was under construction in 1644. However, there is a suggestion that it was actually a battery, as Backhouse (1644, 308) reports “three sconces, one before the east gate, another before the north gate, and the third at the Fryer’s orchard, where the batterie was made at the time of the siege ; all of very great strength, but they are none of them as yet finished”. When analysing the slender work, Rhodes (2014, 163) refers to the North Gate as ‘J’ on the plan and later (Rhodes 2014, 178–179) as ‘I’ and ‘K2’.

Despite Corbet describing the works at the North Gate as slender, the archaeological evidence shows a ditch (**Figure 88**) of significant width and depth. The section drawing below shows that the alignment of the ditch was north–south.



**Figure 88: Evidence of a significant ditch outside the Outer North Gate (After Atkin and Howes 1993, 25)**

The ditch appears to be 8m in width, although this does fall short of the recommended ditch width described by Norwood (1639, 144) of at least 9.1m. This illustrates that the archaeological evidence contradicts the historical documentation of the period. By only focusing on the historical evidence, an inaccurate picture of the size of the fortifications constructed during the Civil War is displayed. The historical information, in this case, is different from the actual reality of the conflict.

The Bruton Way excavation results revealed a bastion face ditch on the Outer North Gate, as illustrated on the Hall and Pinnell plan (Atkin and Howes 1993, 26).

Comparing the archaeological evidence to the plans of the fortifications produces interesting results (**Figure 89**). In this case, archaeology shows a much smaller bastion than the one proposed and illustrated on the Hall and Pinnell plan. It illustrates a significant outer ditch that was not completed, along with a rampart approximately 10m in width (Atkin 1993, 155). The width of the rampart appears to conform to the military manuals of the period or at least to reflect an understanding of the principles, as the minimum thickness suggested was 7.31 m (**Table 1**).

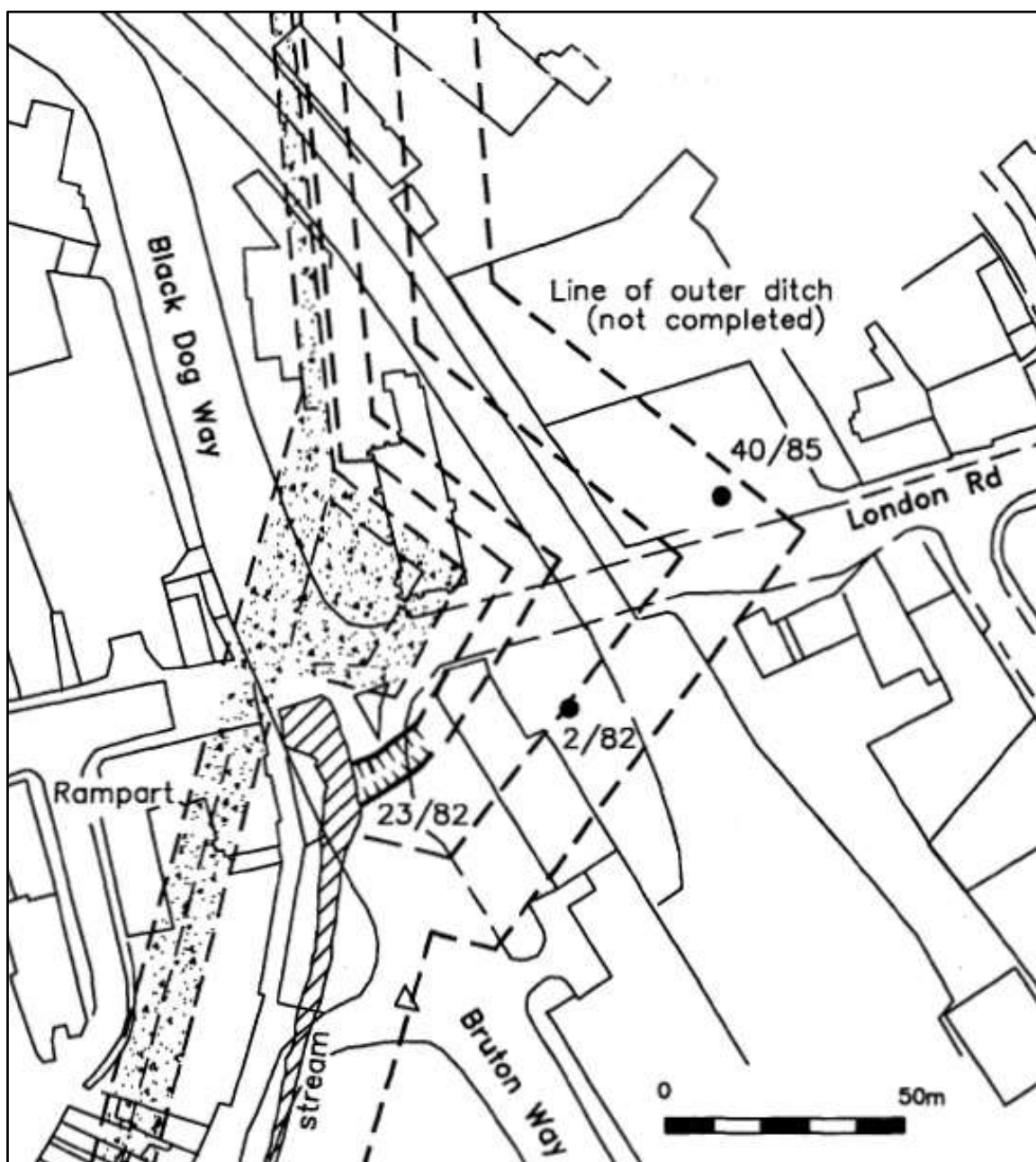


Figure 89: Archaeological evidence versus cartographic information for the Outer North Gate (Atkin 1993, 155)

#### 6.6.4 Friars' Orchard

Excavations conducted in 2006 on Test Pits I and F located evidence that may be indicative of strengthening defences during the Civil War. A defensive ditch was in Trench 7; whilst post-medieval in form, it appears to date to the Roman period (Brett 2006, 5, 12, 17).

Excavations at Site A, Trench 17, conducted in 2010 appeared to show similar evidence to that of the 2006 excavations, with deep uncompacted soils (Layers (1704), (1705) and (1708–1715)) demonstrating the possible infilling of a Civil War ditch (**Figure 90**) (Barber *et al.* 2010, 31–32, 39).



**Figure 90:** The infill of a Civil War ditch? Contexts (1708–1715) in Trench 17 (Barber *et al.* 2010, Figure 6)

Trench 18 revealed evidence of damage to the Roman town wall, probably due to artillery fire during the Civil War, with evidence of an attempt to restore the wall after the war. Structure (1813) contained hard pink-grey mortar, with Layer (1814) of limestone blocks forming the outer face of the Roman wall (**Figure 91**) (Barber *et al.* 2010, 32, 40). Context



(1813) appears to demonstrate the attempted restoration work after the Civil War, whilst Context (1814) may be indicative of the damage to the wall due to artillery fire.

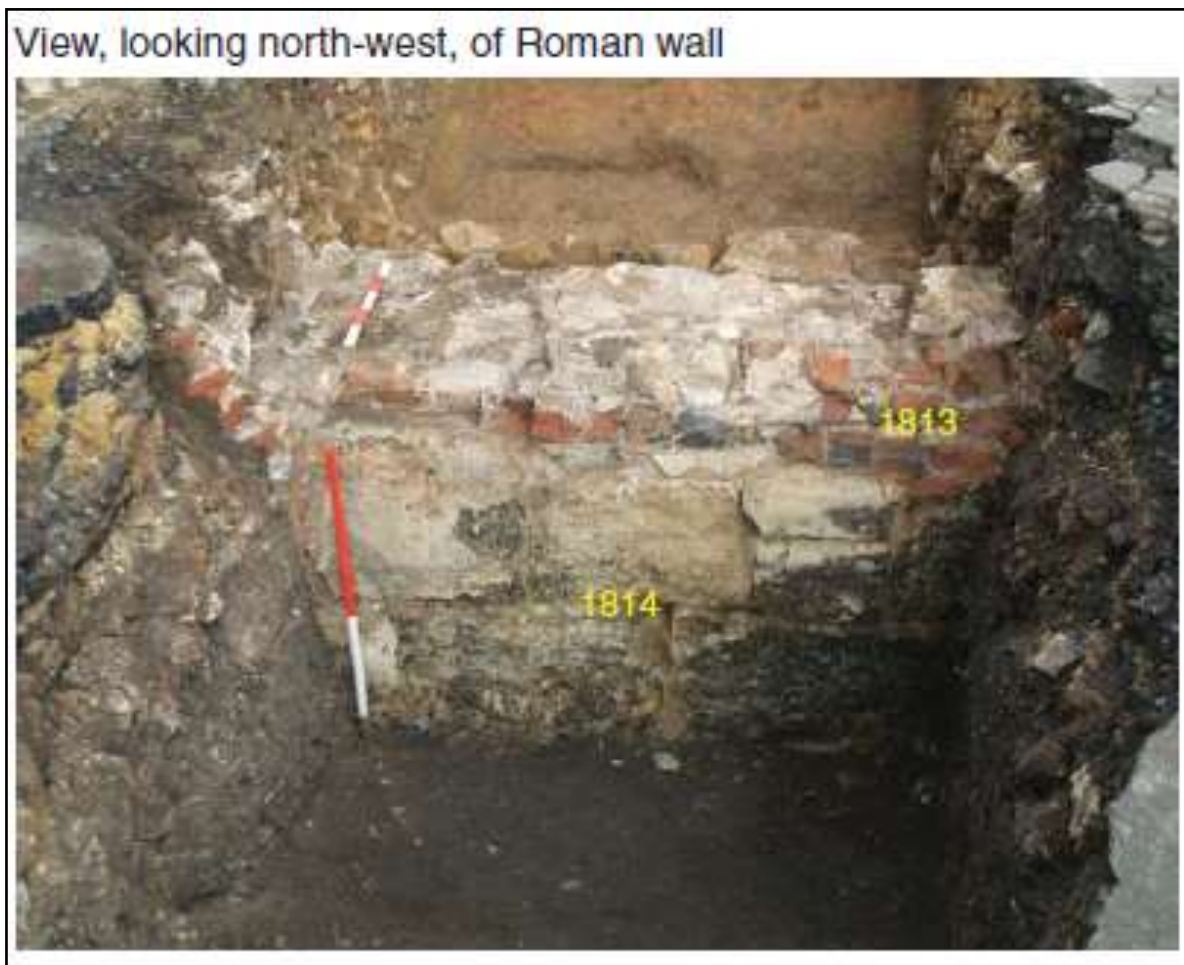


Figure 91: Civil War damage and repair in Trench 18 (Barber *et al.* 2010, Figure 7)

### 6.6.5 St Oswald's

The site of St Oswald's Church is situated to the north of Westgate Street and is bounded to the north by St Oswald's Parade and Priory Road, with the Cathedral Precinct immediately to the south-east. Whilst many people attribute the destruction of St Oswald's Church to the Civil War, historical documentation shows that the church's condition was deplorable in 1643 (Heighway and Bryant 1999, 2, 22, 24).

However, the re-use of material comprising a religious structure illustrates that no feature, no matter its status in the landscape and the importance it played in the daily lives of the people, was immune to being affected by the Civil War. It also illustrates that people were

using whatever material was available in order to defend their city, and the use of stone could have led to the making of more-permanent defensive structures in the city.

#### **6.6.6 Other Sites**

Excavations at St Michael's Square, Site 4/1982, revealed evidence of a ditch more than 20m in width and 3.9m in depth. The inner section might have been connected to a stone wall of 1.37m width that was uncovered in 1883 (Garrod 1983, 31). Whilst 20m is impressive, it falls short of the width dimensions described as necessary by Norwood (1639, 112) and Ward (1639, 60).

A watching brief at the River Twyver, Site 3/1982, for the Inner Relief Road at Black Dog revealed an indeterminate course that had become silted up. This suggests that the small work from Almesham Postern to the Outer North Gate was constructed with soil imported from another area (Atkin and Laughlin 1992, 54; Garrod 1984, 48). The importation of soil suggests that careful planning and thought went into this logistical operation and illustrates another example of how the landscape of Gloucester was altered to defend this area.

Excavations in 1961 on the site of Friars' Orchard at the Technical College on Parliament Street revealed evidence of artillery bombardment of the stone wall (O' Neil 1962, 13; Atkin and Laughlin 1992, 52).

Excavations at 31 Parliament Street (also known as 'Green Dragon Lane'), Site 3/1984, revealed post-medieval backfill to 3.3m in depth in the south section of the medieval ditch (Garrod 1985, 47). If this is of Civil War date, the evidence reveals that medieval ditches were being filled in by the attackers. This evidence demonstrates the lengths that the besiegers would undertake in order to gain a tactical advantage.

Excavations conducted at Ladybellegate Street Car Park, Site 19/91, revealed that the upper layers of the landscape in that area had been stripped to potentially provide soil for the defences of the city, possibly earthen ramparts (Atkin 1992, 35, 37). This is similar evidence as located at the watching brief at the River Twyver, as it illustrates the alteration of the landscape to create defensive positions.

Further excavations at Horton Road Hospital, Horton Road, Site 3/1991, discovered potential evidence for an incomplete guard post relating to the 1643 siege inside an area that was utilised as agricultural land during the medieval period. The reconstructed feature formed an enclosure measuring 30m x c. 20m, with the resulting ditch containing finds of 17<sup>th</sup>-century date. The site was located between two Royalist camps, one at Kingsholm and the other at Matson, with the northern and eastern sides of the city being visible from its location. The



feature might have been a warning post, as, given the size of the ditch, it was unlikely to a form defensive feature or was constructed in connection with Parliament's attack on the Royalist camp at St Margaret's Almshouse on 14<sup>th</sup> August 1643 (Atkin 1992a, 42).

A 3m plus ditch located on Clarence Street is also seen on the Hall and Pinnell plan (Atkin and Howes 1993, 26, 37). Whilst this ditch was insufficient compared to the dimensions recommended in the period manuals, it continues to demonstrate the impact that the Civil War had on the landscape of Gloucester and the numerous ditches (barriers/landscape dividers) constructed.

### **6.6.7 Outworks**

#### **6.6.7.1 Alney Island**

Dorney (1643, 211) recorded that two sconces were constructed at either corner of Alney Island: an area of marshy land between two sections of the River Severn (Atkin and Laughlin 1992, 62). This position was deemed strategically significant because of its view of the River Severn. It also demonstrates an understanding of the surrounding landscape, as a view was taken to construct a defensive feature in a difficult marshy area, suggesting the belief that it was necessary to build on such difficult foundations.

#### **6.6.7.2 The Vineyard, Over**

Welsh forces under the command of Sir William Vavasour "advanced to the Wineyard, where after two houres' solemnity, they with great valour tooke it, no body being there to make a shot against them. Yet upon their entry of the outward worke, when they saw another within, they according to their knowne prowess, immediately ran out, yet taking heart againe, they at last, to their eternall glory, tooke it" (Dorney 1643, 212). As Atkin and Laughlin (1992, 62, 65) note, this action occurred two days after Colonel Forbes and his dragoons withdrew on 10<sup>th</sup> August 1643, burning the site and removing lead from the former palace of the Bishop of Gloucester to make musket balls, thereby making the event described by Dorney clearly propagandist.

Analysing the account of Dorney (1643, 212), it appears that the forces of Vavasour ran up a bank of the outer work and then finding another ran up that. The banks appear to be bastion faces forming a sconce.

The moated site contains a series of earthworks relating to a stone house, which was first occupied by Abbot Staunton in the mid-14<sup>th</sup> century. A geophysical survey using caesium magnetometer and earth resistance techniques conducted in 2009 revealed good potential for

buried Civil War archaeology. This included a buried bank of 7m in width with a 3m wide ditch on its southern side, possibly with a counterscarp and a 4m wide bank. The results also indicate a masonry revetment at the base of the bank. There is also evidence of two extant bastion positions and that the entrance into the earthwork was located on the east. Utilised by the Parliamentarians, the site was abandoned between 1647 and 1648 (Roseveare and Roseveare 2009, 1, 2, 3, 6).

The evidence of a buried bank of 7m in width is just short (by 31cm) of the dimensions given in **Table 1**, suggesting an appreciation/understanding of the principles contained within the military manuals of the period during its construction. This theory is supported by the potential evidence of a counterscarp, suggesting detailed planning and oversight by an engineer of some experience. The only feature not conforming to the literature's standard was the width of the ditch (at the top), being some 6m short. However, this information is still largely theoretical, unless the feature is excavated and precise dimensions are recorded. The evidence does appear to illustrate that it was an impressive feature in the landscape.

## **6.7 GIS Analysis of Gloucester**

### **6.7.1 Gloucester Cartographic GIS Regression Analysis**

Having examined the series of cartographic sources available in section 6.5, further analysis is undertaken using the ArcGIS 10.5.1 programme, in order to test the accuracy of the plans and thereby the earlier findings.

Plan D12862 was geo-referenced using 11 control points, using the spline transformation method, which is “a true rubber sheeting method and optimizes for local accuracy but not global accuracy” (ArcMap 2017, [desktop.arcgis.com/en/arcmap/10.5](https://desktop.arcgis.com/en/arcmap/10.5)), and was saved as a layer (.lyr) (**Figure 92**), in addition to using the transparency technique to further assess the accuracy of the georeferencing.

Hall and Pinnell's (1786) plan of the city of Gloucester was geo-referenced using eight control points using the 1<sup>st</sup>-Order Polynomial (Affine) in addition to being saved as a layer (.lyr) (**Figure 93**). Despite the age of the plan, the position of the fortifications and artillery were relatively accurate when plotted with the aid of the transparency technique.

It was impossible to geo-reference Fosbrooke's (1819) plan of the city of Gloucester. The image became warped after three control points. This is because the image is a generalised representation of the fortifications, containing no scale and was drawn with a significant amount of artistic license.

Atkin's (1988) plan of the Southgate excavations was geo-referenced using 10 control points and the transformation 1<sup>st</sup>-Order Polynomial (Affine) in addition to being saved as a layer (.lyr) (**Figure 94**). Some difficulty geo-referencing was encountered due to the limited reference points on the plan, however, the overall accuracy, with a significant use of the transparency technique at 40%, demonstrated a good location of the bastion in relation to the Roman wall and the important archaeological results discovered of the defences constructed.

The results of the excavations at the Outer Northgate near Black Dog Way by Atkin (1993) was geo-referenced using 10 control points and the transformation 1<sup>st</sup>-Order Polynomial (Affine), in addition to being saved as a layer (.lyr) (**Figure 95**). Analysis of the plan demonstrated the accuracy of the excavations, and the position of the artillery, revealing the location of the rampart and the proposed line of the outer ditch that was not completed.

Day's (2007) plan of the fortifications of Gloucester and the artillery positions of the Royalists' was geo-referenced using 11 control points and the transformation 1<sup>st</sup>-Order Polynomial (Affine) in addition to being saved as a layer (.lyr) (**Figure 96**). The plan demonstrated the key positions, albeit with some positional differences, however, the majority conformed strictly to the artillery positions and thereby the locations of the fortifications throughout the city.

### **6.7.2 Analysis of Cartographic Regression Methodology for Gloucester**

The use of the geo-referencing technique for Plan D12862 including the spline method was significant, as it enabled the newly discovered and old plan to successfully be geo-referenced in the modern cartographic landscape. Combined with the use of the transparency technique and the overlaying of the map on the Historic First-Edition (1:10,560) Ordnance Survey plan, the results demonstrate the accuracy of the technique and how beneficial it is to analysing the effectiveness of the plan.

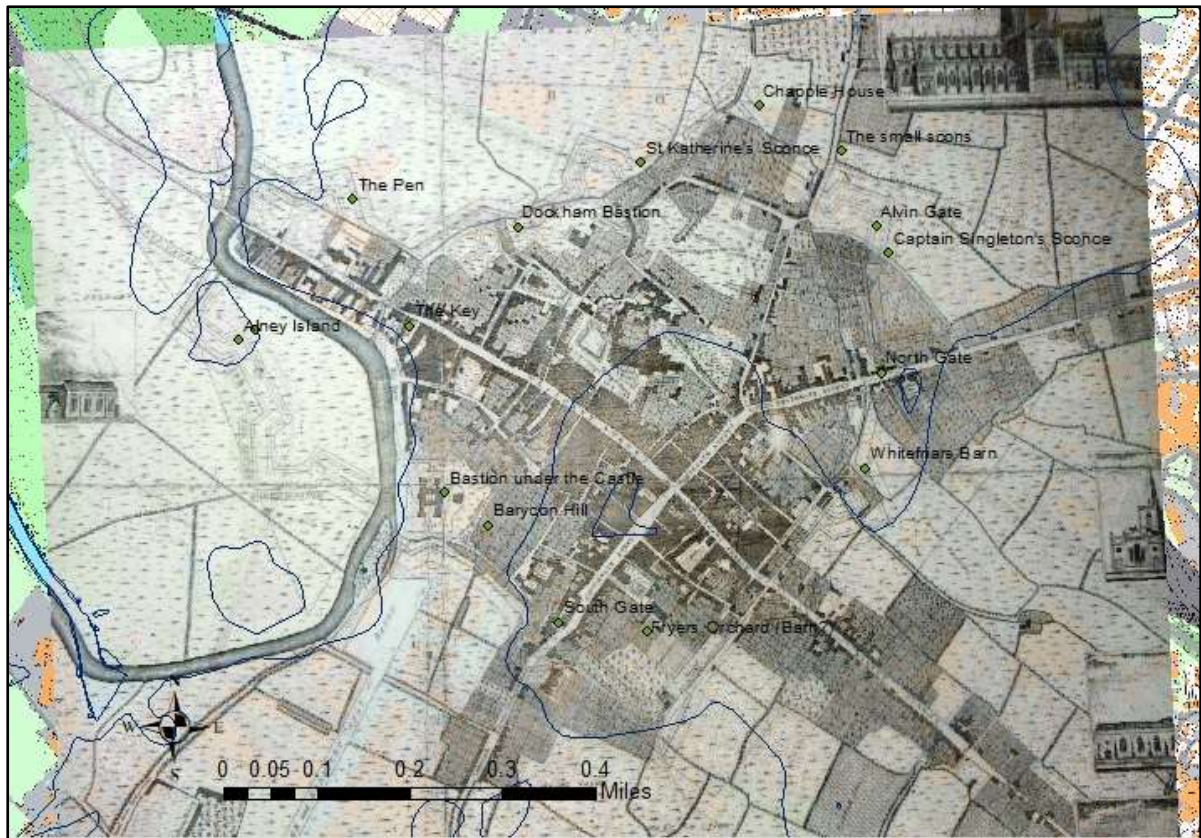
Similar positive results were discovered when geo-referencing Hall and Pinnell's (1786) plan, as it demonstrated the accuracy of the cartographic source and enabled further analysis of what fortifications could have been constructed after the 1643 siege.

A difficulty was encountered when attempting to geo-reference Fosbrooke's (1819) plan of the city. However, this was in part due to the artistic license used by the cartographer, and the lack of any scale to accurately plot the features illustrated.

The importance of geo-referencing both Atkin's (1988) plan of the Southgate excavations and his later (1993) plan of Outer Northgate near Black Dog Way demonstrated a positive use of the methodology. This is because the positions of the excavations and the







**Figure 93: Hall and Pinnell's 1786 plan geo-referenced in the modern landscape with contours and 15% transparency (generated in ArcGIS 10.5.1) (scale 1:11,000)**

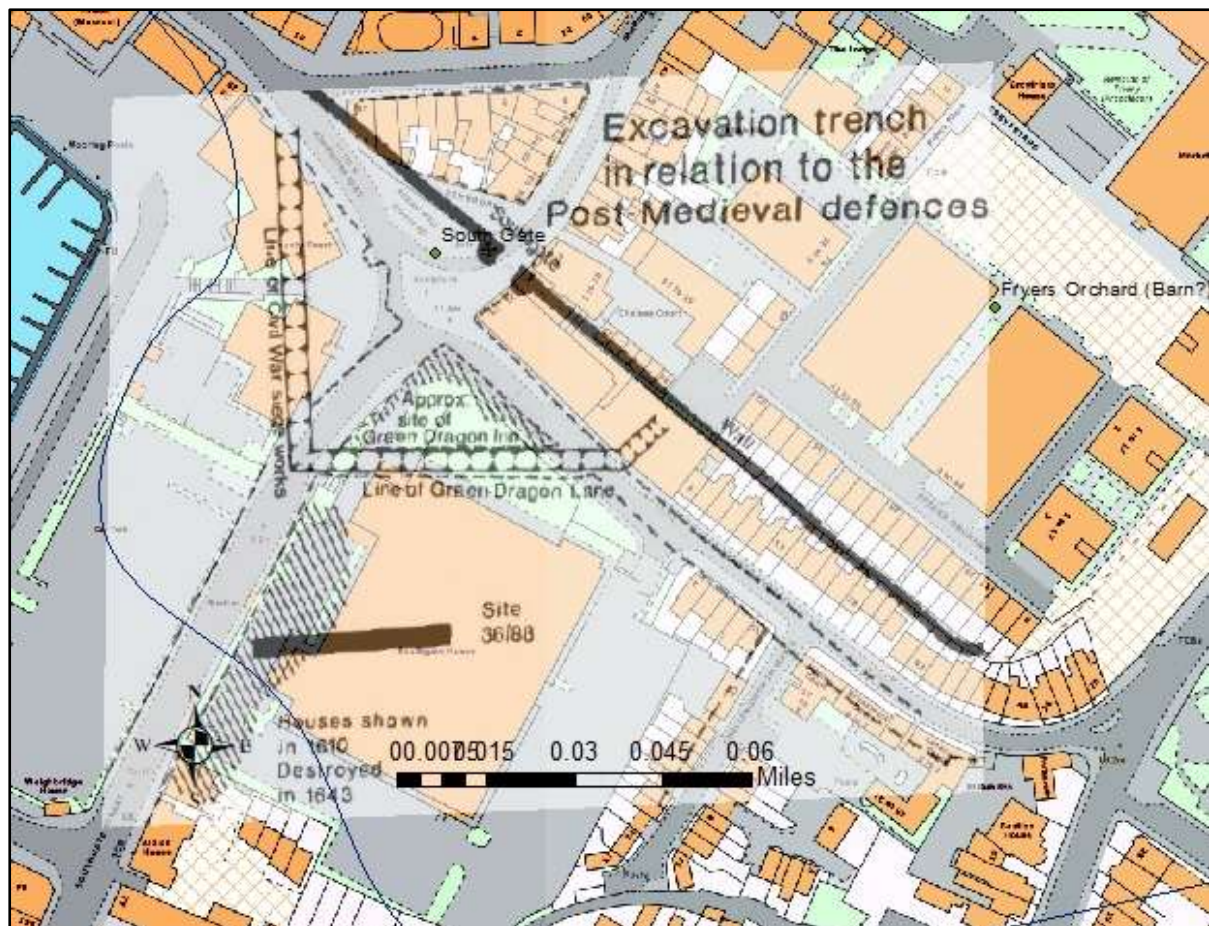


Figure 94: Atkin's (1988) Southgate excavations plan overlain in the modern landscape with contours 40% transparency (generated in ArcGIS 10.5.1) (scale 1:2000)



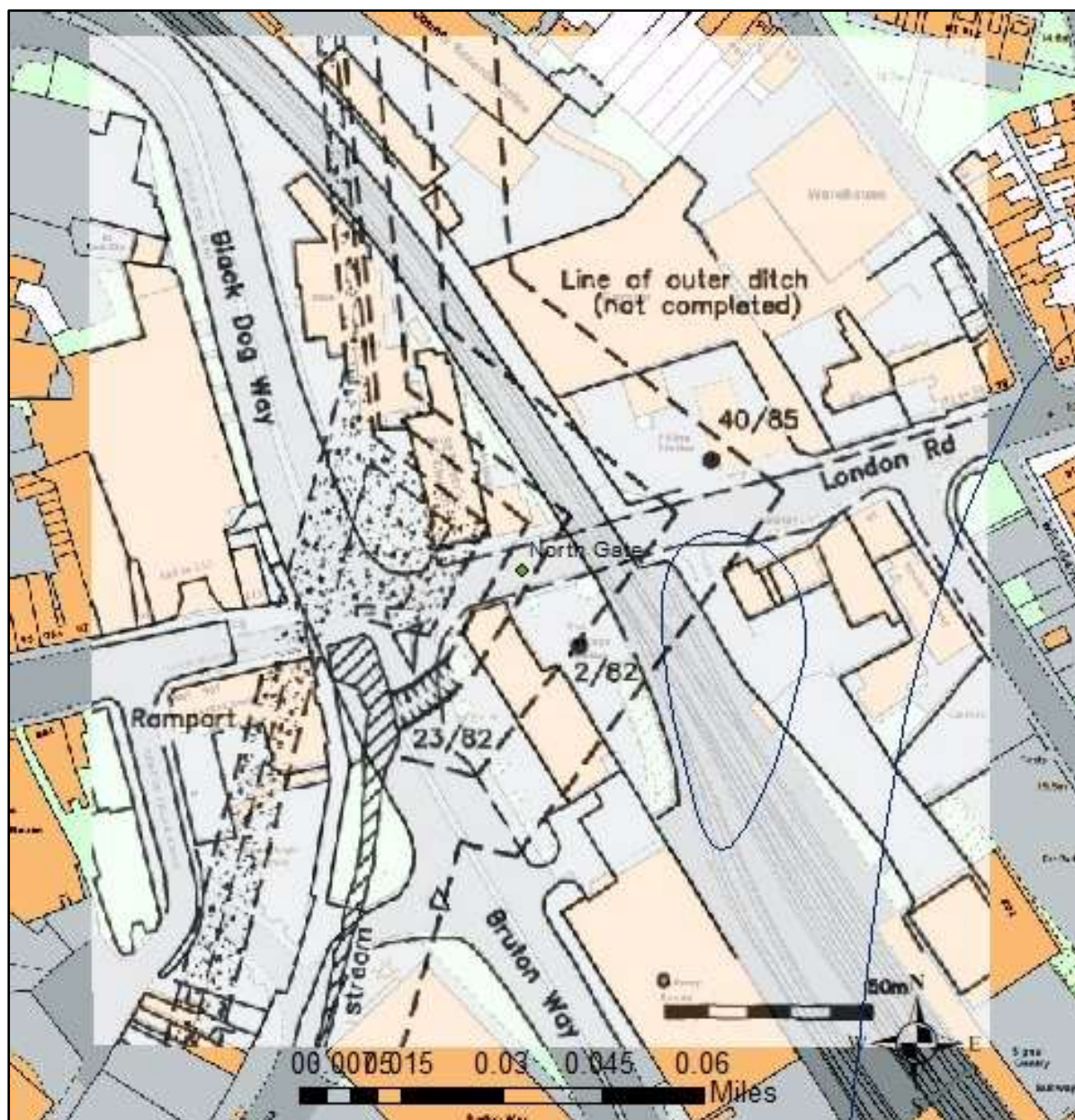


Figure 95: Excavation results at the Outer Northgate (1993) in the modern landscape illustrating contours and 25% transparency (generated in ArcGIS 10.5.1) (scale 1:2,000)

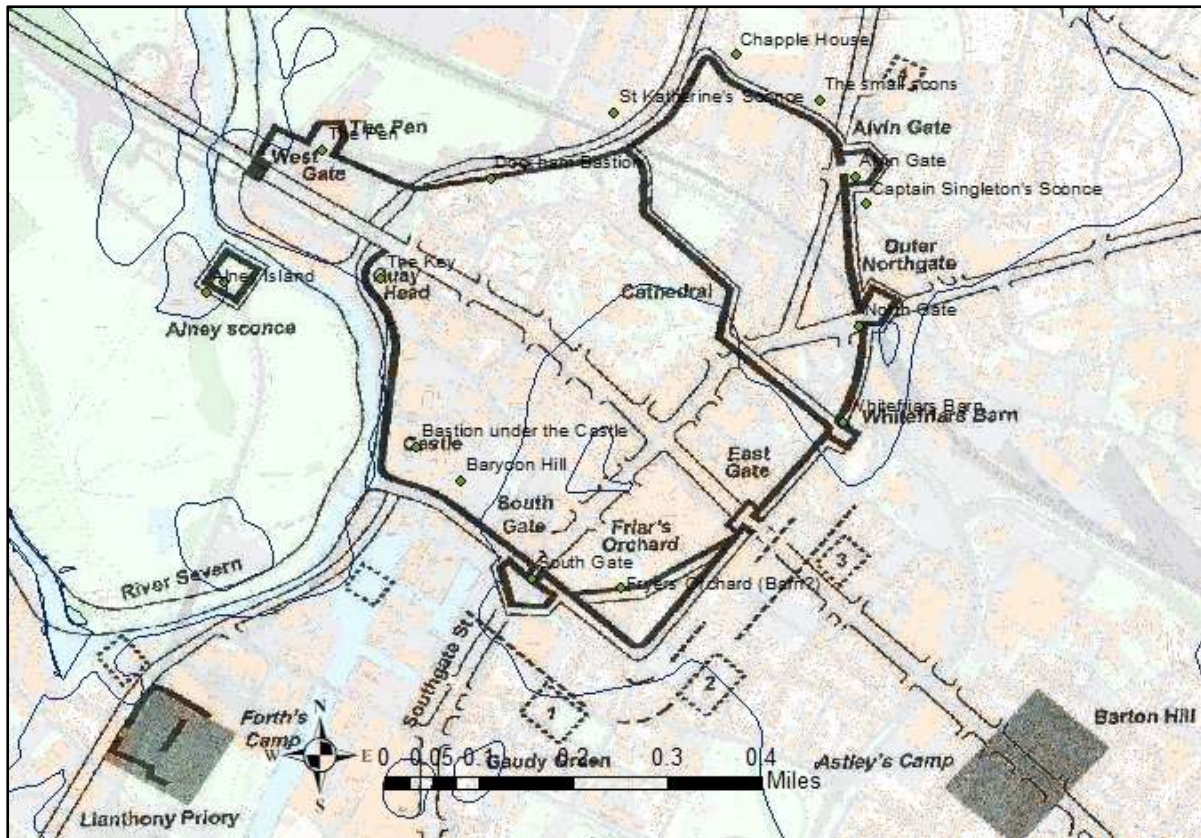


Figure 96: Day's (2007) plan of the fortifications and Royalists' artillery positions geo-referenced in the modern landscape, with 25% transparency (generated in ArcGIS 10.5.1) (scale 1:11,500)

### 6.7.3 New Gloucester Cartographic Sources

Based on the above analysis, and noting the earlier work conducted by Paton and Cook (2016), referred to in section 2.2.6 Site Analysis, and the settings discussed at section 2.2.7.2 GIS Settings, including the work of Partida (2011, 1-4), the defences of Gloucester were drawn utilising information from Plan D12862, the archaeological evidence of Atkin's (1988) Southgate excavations, the results of the (1993) discoveries at Outer Northgate and Day's (2007) plan, in addition to the modern 1:10,000 Raster map. These sources were also utilised for the plotting of the road network and River Severn. The graphics were converted to a feature and saved as a shape file.

Geological and contour data were added onto the 1:10,000 Raster, with positions of the artillery (and fortifications), including road network and rivers also overlain.

The bedrock geological data symbology was modified under the value of BGSRef and the classification increased from five to 30 to demonstrate the changes in the background geology more succinctly. The label field was modified to RCS\_D to illuminate the bedrock the fortifications were constructed on. The labels for the contour data was modified to Prop\_Value, thereby illustrating the aOD of the modern landscape in metres (**Figure 97**).

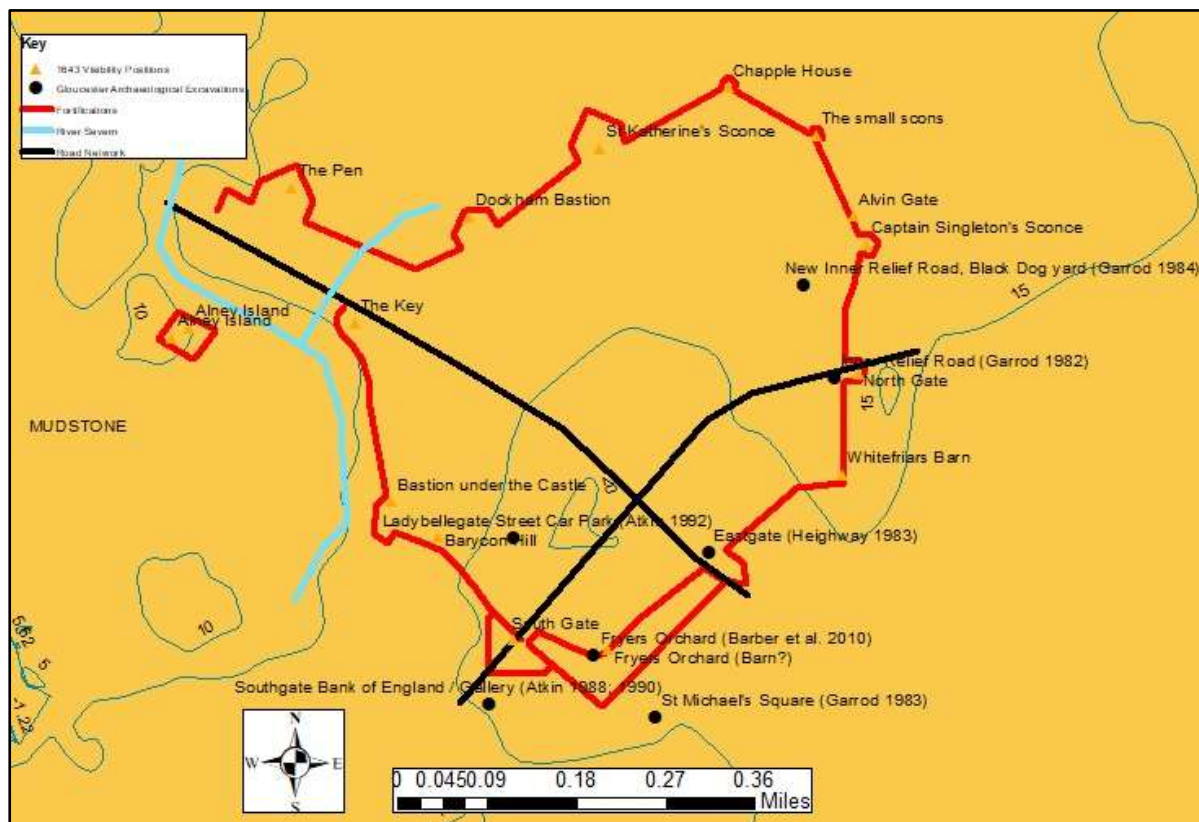


The OS Terrain DTM data, contour data the positions of the fortifications, the road networks and River Avon were placed into ArcScene 10.5.1. The use of this programme demonstrated the topography of the city in 3D (**Figure 98**).

### 6.7.3.1 Analysis of New Gloucester Cartographic Sources

The lack of any high ground and the flat nature of the topography is the key concept of the new plan, with a 15m contour running through the centre of the city. The importance of the River Severn explains the placement of key fortifications, such as The Pen and the sconce at Alney Island. The geology uniformly presents as sandstone across the city, thereby showing an obvious difference to Bristol regarding construction of the fortifications (**Figure 97**).

The 3D depiction of the landscape and the defences (**Figure 98**) does, however, indicate a small rise in the topography around the northern sector of the defences. Like **Figure 97**, the prominence of the River Severn is visually evident. The importance of high ground, of a change in the topography, however small, demonstrates the importance of this new cartographic source and how it continues to emphasise with importance of any high ground when constructing a defensive position.



**Figure 97: Positions of the fortifications of Gloucester in relation to the topography and geology (generated in ArcGIS 10.5.1) (scale 1:10,000)**

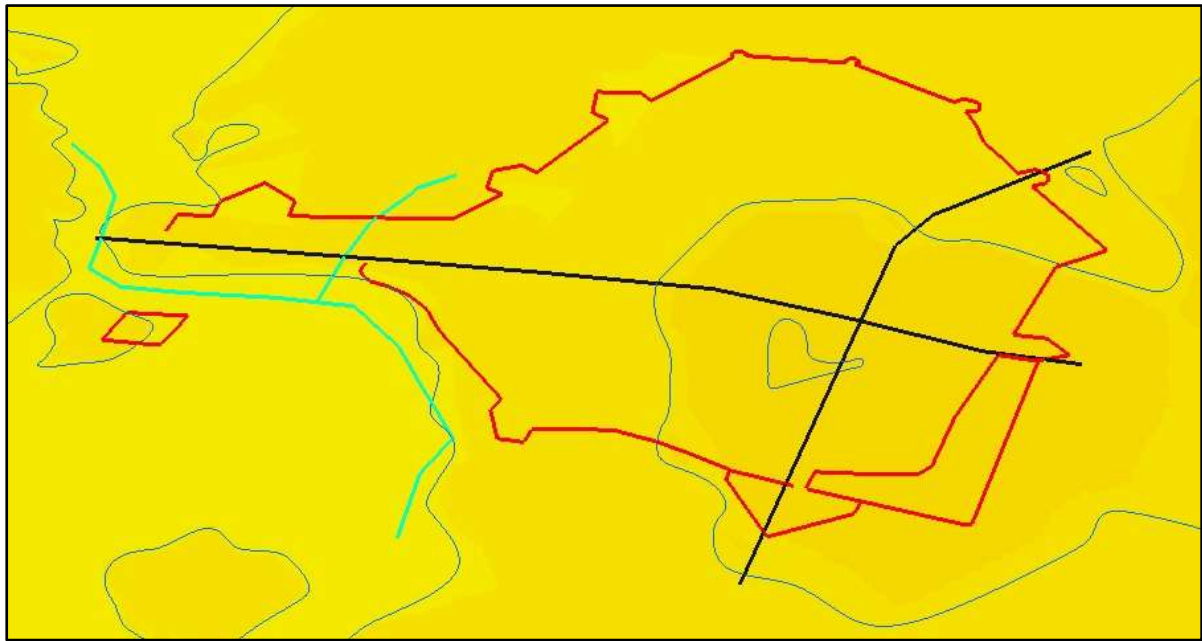


Figure 98: A 3D image of Gloucester showing the flat topography (generated in ArcScene 10.5.1) (no scale)

## 6.7.4 GIS ‘Fields of Fire’ Analysis of Gloucester

### 6.7.4.1 1643

The overall viewsheds (**Figure 99**) despite being theoretical in nature (see section 2.2.7.3 GIS Issues), and having undertaken viewsheds from each defensive location, using the robinet, falconet, falcon, minion, saker and demi-culverin artillery pieces, in addition to musketry and visibility analysis, there are enough issues with the defensive perimeter of Gloucester in 1643 and the subsequent siege. The plan shows the importance of the sconce at Alney Island (technically outside the main sphere of fortifications protecting the city), but an important feature nonetheless to observe any approach from the River Severn. What is evident is that the viewshed analysis suggests that bombardment of the River Severn was not possible, although reality advocates the opposite. This is a methodological issue within GIS. There are viewshed issues regarding defence of the fortifications at The Pen, if access is gained passed the Dockham bastion, to the north-east of St Katherine’s Sconce, the fortification at Whitefriars Barn, and the defences south-east of the fortifications at South Gate.

Turning first to the focused viewsheds of the northern sector (**Figure 100**), the robinet is the dominant viewshed around The Pen fortification. There are also gaps in the effectiveness of the artillery, however, this is due to the topography and the positing of the fortification. Approaching the target from the north-west would have been the most obvious route to a successful assault. The defensive line is protected, including the River Severn, to the Dockham

bastion, which itself, facing a northerly direction has artillery coverage. A problem arises once pass the fortification and into the city, where area appears to be out of range of an artillery. This 'blind spot' would have presented an interesting tactical position if the bastion was breached. It appears that the only logical explanation is the minute changes in the topography that affect the effectiveness of the artillery, as the position is still visible in the landscape.

The defensive line to the north-east and St Katherine's Sconce (**Figure 100**) is protected by the range of artillery available, however, like the Dockham bastion, the sconce has a gap in its defensive coverage immediately to the south-west. In addition, the east bastion and flank of St Katherine's Sconce does not have any protection from the artillery, representing a strategic and tactical weakness in the defensive line and one that could have been exploited, at least for re-grouping besieging troops, for example. The line is protected, predominately by the minion artillery, with a very minor gap towards the defensive work at Chapple House. The musketry proves a useful addition to defend this position, however, the weakness in this section of the defences is to the north-west and a continuation of the problem of St Katherine's Sconce. The viewsheds here show the importance of the range of artillery available, including the demi-culverin.

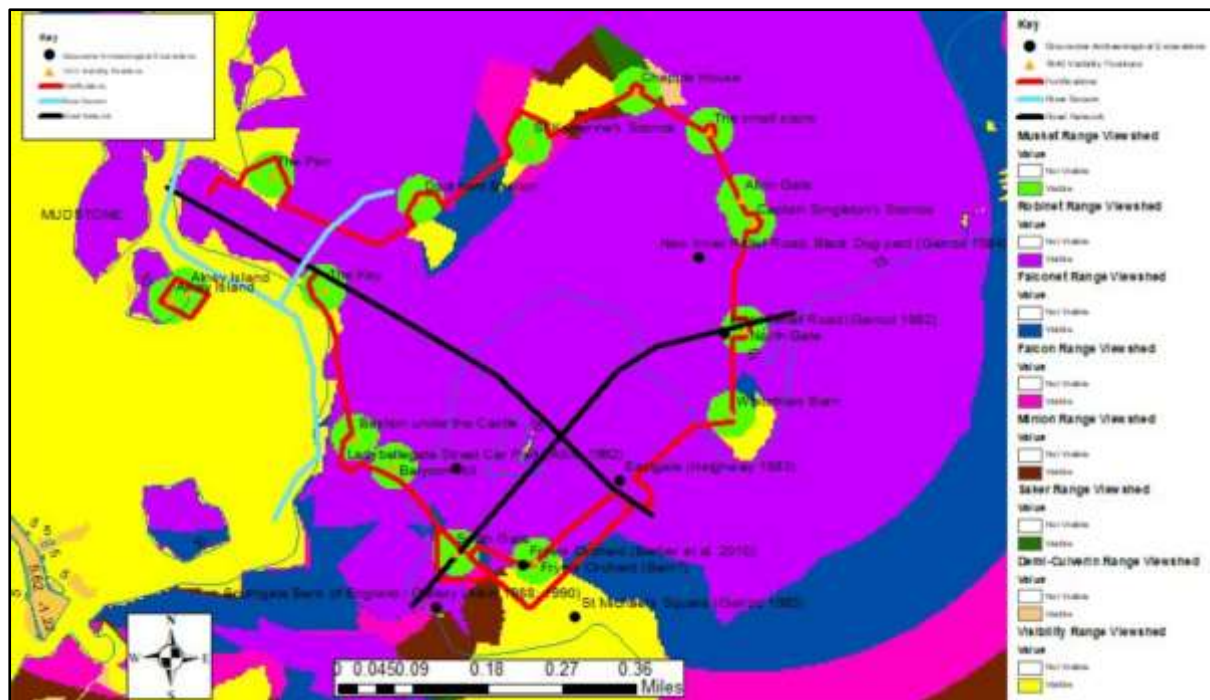
The fortifications, including the defensive line, and the small scones, Alvin Gate and Captain Singleton's Sconce (**Figure 100**) has enough artillery coverage to counteract any immediate threat to the positions. Interestingly, the positions of Alvin Gate and Captain Singleton's Sconce are close enough to provide musket fire, if one or the other, is besieged and overtaken by the enemy, thereby indicating a tactical success, although strategically the need to actually create and man an additional sconce, in this case Captain Singleton's, as the reinforcement of Alvin Gate would have been sufficient to protect this section of the defences. Indeed, the engineer, Papillon formed the same view in July 1646 that Singleton's "...skonce is to be deserted so that the Curtaine may runne strait..." (Atkin 1993, 161).

The southern sector of the defences (**Figure 101**) illustrates the importance of having a fortification cover the North Gate into the city, as it occupies a key road in and out of the city. Turning south, the defensive line remains under the protection of artillery when it reaches the work at Whitefriars Barn. Whilst this position itself is secure, the immediate landscape to the east and south has no artillery coverage. The explanation for this is 15m contour that passes just to the south of that position and is visible on the plan (**Figure 101**); it is the change in topography that causes the area to be seen but unable to be fired upon by artillery, unless the pieces are moved.

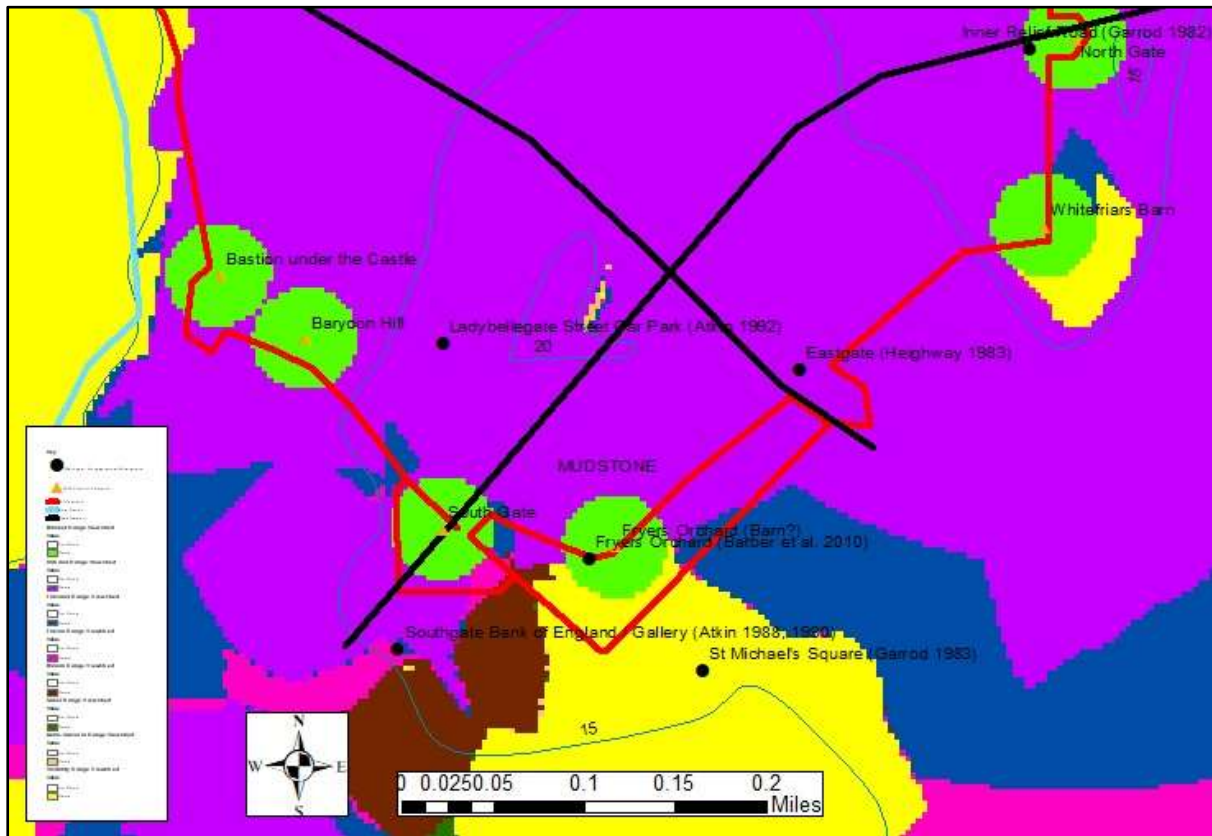
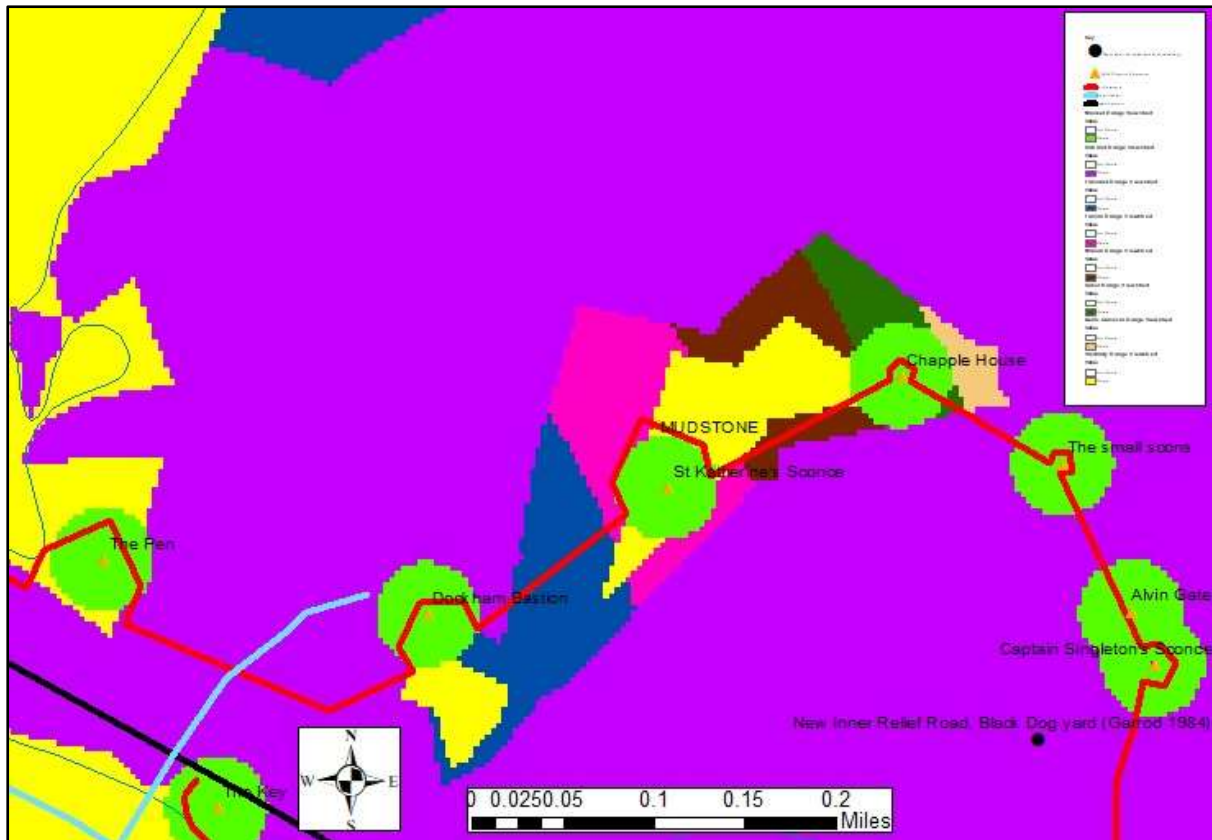
The Eastgate is a well-defended and logical position from which to construct a bastion to defend a key area into the city. The most significant gap in the defences was to the south-east of the South Gate and directly south of the position at Friars' Orchard, where the artillery was unable to cover the Roman and medieval wall, as no bastion had been constructed (**Figure 101**). This explains how the besiegers clearly knew that this was a weak point in the defences and why they decided to construct two artillery positions at this section (Day 2007, Map 2) (**Figure 81**). This also explains why Papillon on 16<sup>th</sup> July 1646 felt that it was necessary to construct a fortification there: "The fourth boolworke is the outr shorter boolworke, next to the south gatte boolworke" (Atkin 1993, 161), as well as why this bastion is shown on the extracted lines of fortifications of Gloucester (**Figure 77**) on Hall and Pinnell's plan. The archaeological evidence of Greatorex (1991) adds further information to support this theory by suggesting the importation of soil to this area to bolster the defences, although Papillon (1645, 11–12) criticises this use of soil as ineffective. Archaeological evidence discovered by Brett (2006) shows modification to the landscape and demonstrates that attempts were made to reinforce this weak point in the defences. The combination of archaeological evidence and viewshed analysis explains the weak position and why it was the focus of the Royalists' attack on the city.

The final two positions of Barbican (Barbycon) Hill and the bastion under the Castle (**Figure 101**) have good coverage of the range of artillery available. Analysing the positions, it appears that the hill was utilised because it was one of the limited areas of high ground available. The bastion by the Castle was undoubtedly constructed to make use of the ruins on the site and high ground available and to observe any enemy troops attempting to storm the city by using the River Severn for a tactical advantage.





**Figure 99: 1643 general viewsheds of Gloucester (generated in ArcGIS 10.5.1) (scale 1:10,000)**



## 6.8 Legacy of the Fortifications of Gloucester

### 6.8.1 Extant Features and Analysis

Only one feature, part of 13<sup>th</sup>-century Eastgate Tower (**Figure 102**), encased in protective glass, has survived into the modern day; as illustrated by archaeological evidence, this tower saw bombardment during the Civil War.



**Figure 102:** Surviving elements of Eastgate Tower, facing south-south-west

The survival of part of Eastgate Tower is a significant part of the legacy of the fortifications in today's landscape. Whilst it has obvious connections to the medieval period and is in part 'fighting' that part of history itself for understanding and legacy, it illustrates the effect that the Civil War had on the landscape of the city. The re-use of a medieval tower represents part of the politics of the landscape. In medieval feudal England, where tenants (general population) were ruled by a landlord (the Crown), this was an analogy for the kingdom as a whole (Muir 1999, 156). For example, two churches, Holy Trinity and St Mary's, were built under the orders of a 12<sup>th</sup>-century king, in addition to a mint. The Crown held the churches until they were transferred to St Peter's Abbey in 1391 (Baker and Holt 2004, 53). The bombardment by the Royalists of sites symbolic with the ideas of one ruler, the divine right of



kings, religion, and ultimate power and control presents an interesting paradox. For King Charles to regain full control of his kingdom, his own forces were required to destroy symbols of the power of the king from the 13<sup>th</sup> century. The once unified country would have had each side believing that it was the other that was unnatural and “violent, chaotic...Political enemies are placed in gloomy and hideous landscapes to hatch their plots” (Turner 1979, 114–115, as cited by Muir 1999, 157). Based on this analysis, it can be inferred that cities like Gloucester were at some point seen as gloomy and hideous landscapes where treacherous plots against king and country were being created.

On the outskirts of the city survives part of a fortification at the Vineyard (**Figure 103**). The earthwork is an important survival of an English Civil War fortification and is a Scheduled Monument. Whilst it has undergone a geophysical survey, like the fortifications on Brandon Hill, Bristol, the Scheduled Monument status has hindered excavation of the feature, and questions remain regarding its construction and the techniques utilised. However, the fact that the site has Scheduled Monument status does demonstrate that it plays an important part in the heritage of this city.



**Figure 103:** Part of the remains of the Vineyard earthwork. A half-metre scale with thistles shows the outer shallow ditch (Atkin and Laughlin 1992, 64)

Partly because of its location outside the city walls and away from the main frontier of conflict, the earthwork at the Vineyard has survived the centuries. As previously discussed,

(Dorney 1643, 212; Atkin and Laughlin 1992, 62, 65), the victory of Sir William Vavasour and his forces was hollow; however, it illustrates the importance of control of territory in the landscape.

The site has an important legacy to play, as it illustrates what an actual Civil War fortification looked like compared to the historical records and what an undertaking constructing these features was. Depending on an individual's view, the site of a Civil War fortification could provoke a variety of responses. To the Royalist storming the fortification, it would have represented an affront to the rightful rule of the king – a symbol of revolt and disunity. To the Parliamentarian, however, the fortification would have been seen as the start of liberation – a move to a society where Parliament represents the people. Either way, the fortification played a role in separating the landscape and dividing the people. A modern parallel can be seen in modern Palestine and the state of Israel. In this example, the roads in the West Bank can be seen as symbols of separation. For Israel, the roads mean that its citizens and visitors to the region can move around and can avoid Palestinian towns; the roads also enable control of the area, with easier movement around the territory for Israeli forces, for example (Selwyn 2001, 228).

Whilst Civil War fortifications in part did not have the same function as the Israeli roads do (although the fortifications' positions in the landscape did cover major roads in and out of towns and cities), their importance was/is demonstrated in the overall role that forts had in the landscape. For the people constructing the fortification at the Vineyard (and indeed other fortifications) for Parliament, against the Royalists, it could have been their symbol: their effort in the war to show which side they supported. For many people, this act, seen by some as defiance against the king, of using spades and mattocks to excavate the earth and construct a fortification would have been the ultimate symbol.

At one level, the Siege of Gloucester demonstrates a division between two sides: the Parliamentarian-held city against the Royalist besiegers. Whilst overall this was the case, there can be no doubt that there were people of both persuasions inside the city of Gloucester and some not wanting to involve themselves in the conflict altogether. Therefore, there were people occupying the same "physical space" (Selwyn 2001, 230) but wanting to live separate lives. Therefore, the surrounding of the city by the fortifications would have continued to demonstrate the division in the city, county and country as a whole.

### 6.8.2 Destroyed Features and Analysis

In Gloucester, most of the fortifications were destroyed soon after the war had ended. A record in the Gloucestershire Archives dating to 1653 revealed the following information (GBR GA F4/5 f.483-5, as cited by Israel 2009, 40):

*“Charges for levelling the Sconce at Eastgate Total 4-13-2.*

*Charges for levelling the Sconce at Southgate Total 8-1-6.*

*Charges for levelling the Sconce at Northgate Total 13-13-0.*

*Charges for levelling the Sconce at the Fryers Orchard Total 5-16-6.*

*Charges for levelling the Sconce at St. Oswalds and making good the way Total 2-6-8”*

(Total = £-shilling-pence).

The above evidence demonstrates that less than two years after the war had ended in 1651, the people wanted to rid themselves of at least five sconces positioned around the city. It is interesting to note that the focus was on the fortifications at the East Gate, the South Gate and the North Gate, which were on three of the main routes into the city. The totals charged suggest that the sconce constructed at the North Gate was the most significant, as it cost £5 more to level than the South Gate and £9 more to remove than the one at the East Gate (constructed after the 1643 siege). The sconce at St Oswald’s appears to have been St Katherine’s Sconce (Rhodes 2014, 182), with the note for removing the fortification (“making good the way”) suggesting that the road network into the city at this junction was surveyed and designated to require improvement.

The guardhouse on Barbican Hill was destroyed in 1647, whilst Alvin Gate was blocked by earth until 1646–1647. The council had Chapple House destroyed in 1653–1654 and the earthwork at The Pen levelled by February 1654. The defences at Whitefriars Barn were destroyed in 1662–1663. At some point in time, the Small Sconce that was built in private gardens was destroyed, and the trace of Captain Singleton’s Sconce is under the houses of 42–50 Worcester Street. Whilst most of the features were destroyed, the defences at The Key were still important in August 1651, as additions were made to the site, and the bastion at Dockham was still in situ in April 1660. However, the bastion constructed below the castle had been levelled by 1712, with the inner ditch having been filled in (Rhodes 2014, 170, 178, 180–182, 184–185). Outside of the city, the site of the Vineyard has some surviving earthworks; however, these were abandoned and robbed for stone after 1643. At some point, the sconces



on Alney Island sat on marshland have disappeared, with their precise locations unknown (Dingwall 1993, 2).

The idea that the fortifications would have received “special attention” (as important markers holding socially significant prominence in the landscape) (Bradley 1993, 26, as cited by Ashmore and Knapp 1999, 15, as cited in Israel 2008a, 4) is a difficult case to argue, as the above evidence suggests that the fortifications did not receive special attention, despite being visually imposing (Ashmore and Knapp 1999, 15). The evidence suggests that the council decided as soon as it was reasonably practicable to remove the earthworks. The reasons behind this are twofold. One is that the fortifications were seen as unhappy reminders of a bloody and difficult conflict. Considering how much of the landscape of Gloucester was destroyed to make way for the construction of the fortifications and to provide fields of fire, it can be inferred that the people of the city wanted to rid themselves of the fortifications as soon as it was clear that the war in the region was over. The second is that the fortifications were stopping the city from regenerating and restarting / returning to pre-war levels of trade and commerce. This was partly due to the placement of the fortifications over the key routes entering the city.

Both reasons suggest an attempt by the people of Gloucester to physically remove the visual vestiges of the conflict from their landscape. By doing so, they started to, in part, move on from the difficult circumstances that they had found themselves in, particularly in 1643. The fact that the war was pitting town versus town, village versus village and in some cases brother versus brother added an additional dimension to the conflict. It can be argued that civil wars are more brutal than wars between separate states/nations. Removing the physical evidence, the reminders of war, can be seen as part of the healing process. This is part of the way that humans look at and use the landscape.

As people look at, feel and move around a landscape, they have a connection with it – an emotion (Tilley 2004, 25). What the evidence of the destruction of the fortifications illustrates was a withdrawal of any emotions connected to the newly created landscape; for example, the fortifications as objects themselves did not inspire people to save them. The destruction of the fortifications brought out strong emotions: an attempt to rid the visual senses of the structures that had affected their way of life and had ended the lives of so many others. A place contains memories, symbols and histories (Tilley 2004, 25); the destruction of such places begins to degrade the memory and the symbolic image / perceived importance of the places. It is the passage of time, of generations that did not exist, during those events that means that the legacy (and the attempt to establish its importance) is a difficult experience that must

endure if people are to continue to appreciate and understand the surviving features in the landscape and the ones that no longer exist.

## **6.9 Summary**

The evidence revealed and discussed in this chapter has demonstrated that the low-lying landscape of Gloucester had an immense impact on the design and placement of the fortifications constructed to defend it. The documentation provided by Corbet and Dorney told a story of incomplete fortifications and ditches whilst using the excavated earth to provide the most basic defensive cover for buildings.

The recent discovery of a contemporary cartographic source, Plan D12862, has greatly increased knowledge of the known and planned defences of the city. Later cartographic sources, such as Hall and Pinnell's versions, highlight later designs and improvements to the fortifications. The importance of these sources is seen in the regression analysis and the success of this methodology.

The archaeological evidence adds a further dimension to the historical record, with evidence of bombardment discovered at the East Gate, along with the recutting of ditches to potentially flood a site to add an extra defensive element. The partial survival of Eastgate Tower, whilst having connections with the medieval landscape, illustrates the effect that the war had on the landscape of the city.

The use of GIS viewshed analysis in investigating the city of Gloucester and the artillery positions has demonstrated the importance of the River Severn to the city and has shown that, generally, artillery coverage of the city was good. The weaknesses in the artillery coverage were understood, particularly by the besiegers, as demonstrated by the assault and artillery positions on the Roman and medieval wall near Friars' Orchard. This in turn demonstrates the effectiveness, perceived or not, of the modern fortification, as they focused on a position without such features. However, ultimately, the besieged held out for Parliament.

## **Chapter Seven: The Fortifications of Worcester**

### **7.1 Introduction**

The final case study examines the city of Worcester, its landscape and the placement and creation of the fortifications. Like the previous two chapters the landscape and the fortifications are scrutinised by studying the underlying geology, historical documentation, cartographic evidence, GIS viewshed analysis and the results of archaeological excavations.

### **7.2 The Sieges of Worcester**

#### **7.2.1 The 1643 Siege of Worcester**

On 30<sup>th</sup> September 1642, Nehemiah Wharton, writing from Worcester (Ellis 1853, 330), described the county of Worcestershire as a “pleasaunt, fruitfull, and rich country, abounding in corne, woods, pastures, hills and valleys” (Ellis 1853, 328). Wharton continued to describe the city as situated “on the east bank of that famous river Severne. The wall in the forme of a triangle, the gates seaven, the bulwarkes five, but much decayed : no castle, only a mount of earth...This citty hath also a stronge stone bridge over Severne, consistinge of sixe arches, with a gate in the middle of the bridge, as stronge as that on London Bridge, with a perculis” (Ellis 1853, 328). The reference to five bulwarks appears to be a reference to five towers (Atkin 1995, 55). The reference to seven gates is ambiguous, as documentary evidence from Beardsmore (1980, 61) indicates four main gates: Foregate, St Martin’s Gate, Sidbury Gate and Bridge Gate, with five minor gates: Trinity Gate, Friar’s Gate, Frog Gate, Water Gate and St Clement’s Gate.

On 7<sup>th</sup> October 1642, Wharton, still writing from Worcester (Ellis 1853, 334), reported that earlier in the week, on Monday, soldiers were to be paid 12 pence every day; on Wednesday, he went to view the soldiers’ progress and recorded that several “scaunces, half moones, redouts” (Ellis 1853, 333) were in the initial stages of construction, which were being built “on one side of the city, and goe round the city unto Seuerne againe. It will be finished with all convenient speede” (Ellis 1853, 333).

At the start of the conflict, the fortifications of Worcester consisted of its medieval walls lined with earth of 6–9 feet (1.82–2.74m), with ditches of 36 feet (10.97m) in width and 10 feet (3.04m) in depth. In a northerly direction from the old Severn Bridge (between Tyebridge Street and Newport Street), the defences ran along the bank of the river, encompassing the church of St Clement. From here, they turned east towards The Butts and Sansome Street, which were interrupted by Foregate. The defences then turned south along modern City Walls

Road to St Martin's Gate. From here, the line went to Sidbury Gate, at which point it turned west along King Street (enclosing St Peter Church as it went) to the site of Worcester Castle. Finally, it followed the quayside wall line along the riverbank to Bridge Gate. Outworks and bastions were also constructed, with intelligence reports from 9<sup>th</sup> October 1642 reporting that "We have made some small works upon the hill neere Worcester...neere Severn" (Howes 1642, 13); Atkin (1995, 55) suggests that these works were the forerunners to Fort Royal. In addition, some suburbs were destroyed (Atkin 2008; 29–30; Barratt 2009, 98; Hutton 1999, 182).

The city ditch formed an essential element of the defences of Worcester. Even though the ditch had been scoured in 1638, Richard Wylde in 1643 complained of the smell coming from the ditch (Beardsmore 1980, 63). This suggests that it was prone to flooding and could have played a strategic role during the war as another element in the defensive barrier. This also suggests that construction of the fortifications was favoured instead of general civic maintenance during the war, as no doubt people would dispose of waste in the ditch. Atkin (2008, 33) suggests that there is no evidence that the ditch was cleaned and proposes that the besieged relied, in part, on the boggy fill; he states that the ditch would have formed a secondary defensive feature, having been overshadowed by outer works, including Fort Royal.

In the months before the siege, the *Chamber Order Book of Worcester* recorded on 2<sup>nd</sup> March 1642/3 (Bond 1974, 361) that the governor, Sir William Russell, was considering introducing charges "upon the cittizens concerning the raysing of money for the souldiers and fortiff[ic]acions of the citty" (Bond 1974, 362).

Another record notes that "It is ordered that there shall be raised fowertie shillings every day in the weeke (except Sundaie) for the payment of 60 men dayly that shall worke in the fortification of this cittie soe long as the worke shall continue" (Bond 1974, 364). As previously discussed, Norwood (1639, 123) believed that one man could dig 500 cubic feet (14.1 cubic metres) per day. Extrapolating this data suggests that 30,000 cubic feet (846 cubic metres) of earth should have been moved per day; over a six-day week, 180,000 cubic feet (5,076 cubic metres) should have been distributed accordingly (presumably to create ramparts (ditches) and bastions).

On 29<sup>th</sup> May 1643, the Parliamentarians under the command of Waller arrived with 3,000 men and eight cannons. Their attack focused on the southern and eastern sides of the city, with emphasis on St Martin's Gate, Green Hill, Friar's Gate and Diglis. After an artillery reply from the Royalists, a battle occurred at William Berkeley's house (which was later transformed into a blockhouse, now rebuilt as Diglis House) underneath Castle Hill; in addition, a cavalry charge from St Martin's Gate attempted to push back the attacking troops

from the eastern side. The brief siege was unsuccessful, and, on 31<sup>st</sup> May 1643, the Parliamentarians withdrew to Gloucester. After the Siege of Worcester, the suburbs outside the city walls were levelled, with an area of approximately 600m cleared by Foregate. Money was raised to improve “bulwarks and fortifications” (CBA 398330 (HCC 586), as cited by Atkin 1995, 51), and 50 people of the hundred from Doddingtree were ordered to work on the city’s defences (Atkin 1995, 50–51). However, Sir Samuel Luke, a Parliamentarian, reported that the city was considered “very weake” (Philip 1950, 87) and recorded the following on Thursday 1<sup>st</sup> June 1643: “warrants sent out into the country, to come in with mattocks, spades and shovells to make their workes stronger, and to prevent our forces from comming to neere the towne, and all from 16 to 60 were likewise warnd to come in, but none came in” (Philip 1950, 87).

### **7.2.2 The 1646 Siege of Worcester**

After the 1643 siege, the remaining suburbs were destroyed, which included the destruction of the Foregate suburb and the inner suburb of St Oswald’s in the 1646 siege (Hughes 1980, 287–288; Barratt 2009, 98), which began on 20<sup>th</sup> May 1646 and ended when Worcester surrendered to Parliament on 23<sup>rd</sup> July 1646.

At the start of the siege, the city was under the command of Colonel Henry Washington (who fought in Bristol and Gloucester) and had an estimated civilian population of 5,676 with a garrison of 1,507 (1,600 recorded by the city), which included 400 of the city regiment and 224 cavalry. In total, 28 artillery pieces were placed around the city, which included six light drakes and some ‘sling-pieces’. The artillery was manned by 58 gunners (Atkin 2004, 125, 128; Barratt 2009, 98–100).

On 21<sup>st</sup> May 1646, the Parliamentarian commander Colonel Edward Whalley positioned troops near Roger’s Hill to the north-east of the city. The chamber record for 23<sup>rd</sup> May 1646 notes that the people of the city should provide money to maintain a garrison of 1,600 soldiers (Bond 1974, 410). On 24<sup>th</sup> May 1646, Washington launched an attack on Whalley’s position, from which he claimed to kill or maim 40. The next day, Whalley started constructing siegeworks (ditches and sconces) from Roger’s Hill and Wheeler’s (Rainbow) Hill. By 3<sup>rd</sup> June 1646, the siegeworks extended from the south at Windmill Hill to Barbourne to the north and towards the River Severn. Men in large numbers were conscripted to work on the siegeworks, which were guarded by 500 foot soldiers and 200 cavalry (Atkin 2004, 125; Barratt 2009, 100–101).

On 16<sup>th</sup> June 1646, the Royalists raided the Parliamentary-controlled suburb of St John's. That same evening, the Parliamentarians fired three celebratory shots to commemorate the fall of Oxford, the Royalist capital (although surrender did not take place until a few days later). The following day, 13 shots were fired at The Cross Inn and St Martin's Church. The besieged responded by creating some 'last ditch' defences between Foregate Street and St Clement's Church, whilst Washington continued to launch periodic raids and to reject calls to surrender (Barratt 2009, 102).

Colonel Rainsborough had replaced Whalley as commander of the Parliamentary army. He immediately placed two sakers on Red Hill Cross, which dealt significant damage to the defences, and started constructing further siege lines between Red Hill and Perry Wood. Sprigg (1647, 290) noted that Rainsborough "laid his foot quarters close to the enemy's works, and in two or three nights (according to much judgment and resolution) raised a work which much annoyed the enemy's great fort". Despite problems in the city, the Royalists responded by positioning two sling-guns and another artillery piece on the tower of the cathedral. They also stopped the construction of a new siegework at Wall's Furlong and continued to line the medieval walls with earth. However, food was in low supply, and the citizens of the town forced Washington to surrender. On 16<sup>th</sup> July 1646, a truce was commenced, with further terms given by Rainsborough on the 18<sup>th</sup>. At this time, the city had food for a further two weeks and one day of gunpowder, with some of Washington's garrison leaving for foreign wars. The city capitulated on 23<sup>rd</sup> July 1646, with the Royalist garrison marching to Rainbow Hill after a service at the cathedral (Atkin 2004, 126; Barratt 2009, 104–105). The terms of surrender made clear that the forts and ordnance "shall be delivered, without wilful spoil" (Sprigg 1647, 291).

### **7.2.3 The 1651 Battle of Worcester**

In March 1651, Parliament ordered the destruction of the defences of Worcester; however, the city was taken by the Royalists. On 23<sup>rd</sup> August 1651, King Charles II was proclaimed King of England there; the following day, he ordered the people of Salwarpe parish to send "30 able men to work at the fortifications of this city, and in regard of the necessity to begin tomorrow morning (Monday) at five o'clock" (850 Salwarpe, BA 1054/1, as cited by Atkin 1995, 131) (Atkin 1995, 129-131).

The core of the defences remained the medieval walls and ditches, along with the seven gates of the city, which were blocked; London Road had earthworks built on it and Fort Royal was rebuilt to command Red Hill to the east and the eastern defences of the city. There are differing accounts as to whether Fort Royal was complete. It is unlikely that the defences of



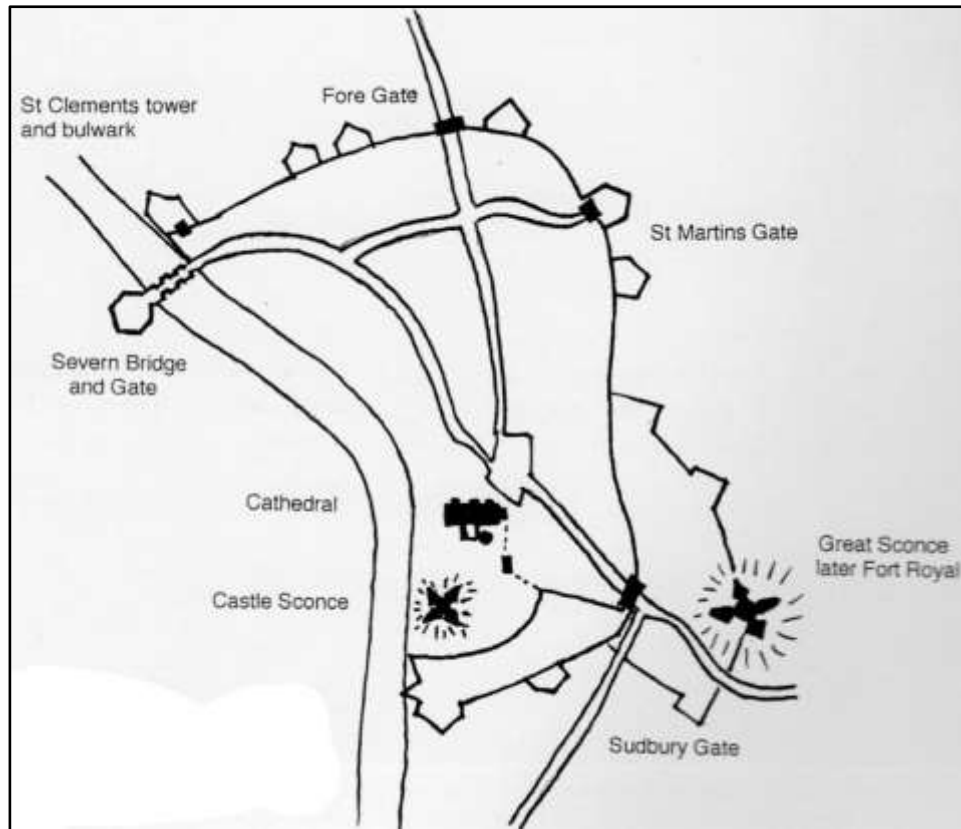
the city were completed to a sufficient standard or that the Royalists had enough artillery to successfully defend it. King Charles II was housed near the Old Cornmarket inside the city. The citizens of Worcester volunteered to help to clean ditches and restore the medieval wall (Atkin 1995, 131–132; Atkin 2004, 138; Atkin 2008, 29).

On 3<sup>rd</sup> September 1651, the battle commenced at around 5am. The Royalists had an army of 2,000 English men and 13,000–16,000 Scots, whilst the Parliamentarians had the New Model Army of 30,000 men. Fort Royal was taken by the Parliamentarians, with the artillery turned around to destroy the city. They also recrossed the River Severn from the west to assault Diglis and attack the south of the city near Worcester Castle. At around 5pm, the defensive lines near Fort Royal and Sidbury Gate were broken through. The Royalist troops on Castle Mound were the final ones to surrender. Approximately 10,000 Royalists were captured and c. 4,000 Scots were killed (Atkin 1995, 136, 139; Atkin 2004, 144; Atkin 2008, 68).

### **7.3 Topographic and Geological Analysis**

Topographically of the fortifications constructed (**Figure 104**) the bastion at the Causeway, over the River Severn to the west of the city sat at 11m aOD. To the north-west of the city, in front of the medieval wall was St Clement's Sconce at 12m aOD. Continuing along the wall was a bastion at The Butts, situated at 21m aOD. There was a short distance to the bastion at The Butts / Farrier Street, located at 21m aOD, with another bastion positioned at Sansome Street and at 23m aOD. The city wall curved south-east towards a sconce at St Martin's, positioned at 21m aOD. The line headed south towards the bastion south of St Martin's Sconce, which was at 20m aOD. The line continued south towards The Blockhouse at Friar's Gate, located at 20m aOD. Heading south, the defensive line split in two. One continued following the medieval wall and curved south-west, meeting a bastion at Severn Street, positioned at 18m aOD, and then towards a bastion at Severn Street / Diglis, located at 16m aOD. A second line headed south-east towards a hill and the site of Fort Royal, with that and the earlier fortification located at 38m aOD (Memory Map).

The evidence illustrates that the majority of the fortifications constructed hugged the medieval wall. The placement of a bastion over the bridge at the Causeway illustrates that the defenders felt that it was necessary to defend the River Severn and the bridge crossing it; this also explains the placement of St Clement's Sconce. The placement of four fortifications along the northern section of the medieval wall suggests that the defenders were concerned with an attack from the north, particularly with the bastions at The Butts and The Butts / Farrier Street in such close proximity.



**Figure 104: The fortifications of Worcester (Osborne 2004, 121)**

The fortifications at St Martin's Gate and The Blockhouse at Friar's Gate and the bastion over the bridge at the Causeway, are the only three directly covering roads in and out of the city, suggesting that placement of the fortifications was not overly concerned with blocking communication lines and supply routes. Overall, it appears that the advantage of high ground dominated the placement of fortifications, particularly with the works of Fort Royal at 38m aOD.

Most of the fortifications were constructed geologically on Sidmouth Mudstone Formation. The bastion at the Causeway (west end of the bridge) sat on sediment and artificial deposits, suggesting that the area had been modified. The site of St Clement's Sconce sat on superficial deposits of alluvium consisting of clay, silt and gravel. The alluvium deposits are explained by the location of the fortification on the bank of the River Sever.

The bastion at The Butts, the bastion at The Butts / Farrier Street and the bastion at Sansome Street all sat on superficial deposits of sand and gravel.

The sites of St Martin's Sconce, the bastion south of St Martin's Gate and The Blockhouse at Friar's Gate sat on superficial deposits of alluvium consisting of clay, silt, sand and gravel. The alluvium deposit suggests some past flooding of the area. The site of Fort Royal

sat on siltstone, suggesting that it was not the best material to construct a fortification from and that the location of the feature was of upmost importance.

Finally, the bastion at Severn Street and the bastion at Severn Street / Diglis would have sat on superficial deposits of sand and gravel.

## **7.4 Historical Analysis of Worcester**

Worcester does not have accounts of the fortifications like de Gomme's analysis of Bristol and the descriptions of Gloucester by Corbet and Dorney. However, sources such as the *Chamber Order Book of Worcester* and the Worcestershire magistrate Henry Townshend's contemporaneous diary of the 1646 siege do exist.

### **7.4.1 The Chamber and Henry Townshend Accounts**

Selected extracts from the chamber record and the account from Henry Townshend are displayed below.

On 11<sup>th</sup> March 1642/3, the chamber recorded that the city should pay “£180 the moneth upon this cittie for the payment of souldiers and for fortificacion of this cittie, and that it is here affirmed that the souldiers doe not expect any paie and that they are willing to prepare and raise threescore men every day to worke for the fortification of this cittie” (Bond 1974, 363).

The 13<sup>th</sup> June 1643 record (Bond 1974, 365) notes that “the timber stone tyles and other materialls of the houses late of Mrs Fleet which are now pulled downe for fortificacion shall be seised for the use of the cittie” (Bond 1974, 366).

On 10<sup>th</sup> July 1643, the chamber recorded that “every one of the chamber and every able commoner shall send a man to worke at the Foregate in the towne ditch for Tewsdays and Wednesday next to make reddie the said worke against the queens majesties coming into this cittie” (Bond 1974, 368).

The chamber recorded on 30<sup>th</sup> October 1643 that discussions took place to remove houses near Sidbury Gate. The houses of Mr Street were confirmed destroyed on 20<sup>th</sup> November 1643 (Bond 1974, 374–375).

On 17<sup>th</sup> November 1643, “£150 soe lent shall be employed in makeing of drawe bridges and other fortificacions of this cittie” (Bond 1974, 374).

On 19<sup>th</sup> February 1643/4, the chamber recorded that Prince Rupert ordered 300 workmen to work on the fortifications and “to paie them from day to day soe long as the worke shall continue” (Bond 1974, 377). The city was divided into six sections, and even strangers to the city were required to work on the fortifications one day of the week, or in the county overall.

When entering the city, every man should have a spade, shovel or pickaxe; if not, they should buy one. The record notes that the same order was in effect in Oxford (Bond 1974, 377–378).

The chamber recorded on 23<sup>rd</sup> August 1644 that people should work under the command of Colonel Martin Sandys “within the walls for the fortificacion of this cittie” (Bond 1974, 382).

Payments against Lady Gerrard and Mr Doctor Lake were discussed for the “bridge fortificacion of this citty” (Bond 1974, 395) at a chamber meeting of 9<sup>th</sup> June 1645 (Bond 1974, 394–395).

Further houses were to be destroyed after a chamber meeting of 20<sup>th</sup> June 1645 for the fortification of the city but in such a way that the “materialls thereof may be preserved” (Bond 1974, 396).

The chamber record of 22<sup>nd</sup> August 1645 notes that the sum of £40 should be repaid to the people for a drawbridge at the (River) Severn, whilst Mr Gatten was paid £10 for engineering work on the fortifications in the gardens of Blackfriars, Dolday and Froggate. Interestingly, the drawbridge required a further £20 from the city to complete its construction, according to the chamber record of 26<sup>th</sup> September 1645 (Bond 1974, 398–400).

The chamber recorded on 22<sup>nd</sup> December 1645 that a reprieve was given to William Gibbs on his yearly rent for the ground he owned near the city wall, with the town clerk also given a reprieve of 10s rent for the removal of his houses for the construction of fortifications (Bond 1974, 405–406).

Henry Townshend recorded in one extract for 1643 that:

*“the ordinary sort of women out of every ward within the City joined in companies and with colours and drums, striking up with spades, shovels and mattocks did begin to work upon Tuesday last being the 30<sup>th</sup> day of June who were to the number of 400 on a day going in a warlike manner like Soldiers, and did so behave themselves therein in slighting all such fortifications as were left by the Earl of Essex at his being here, and throwing down of ditches that by their own Industry and free service (in imitation of the She Citizens of London) as they within one week will perfect the levelling of the same...by reason some of them were killed in the siege (though casually) and also to ease the soldiers, who being weary of the late hot service desiring some rest, and to prevent Sir W. Waller’s approach near, if he should return suddenly against them”* (Willis Bund 1916, 123–124). This included the removal of “trees, hedges, mounds and fences which might any manner prejudice the City and help and succour the Assailants or enemies and likewise all Houses or buildings be immediately plucked down and levelled” (Willis Bund 1916, 123).

#### **7.4.2 Analysis of the Chamber and Henry Townshend Accounts**

The extracts from the *Chamber Order Book of Worcester* demonstrate that significant sums of money were channelled into paying for the construction of the fortifications and for the soldiers, including the construction of drawbridges.

The information illustrates two important points: (i) the people of Worcester were required to pay for soldiers (but not directly pay them) and for the construction of fortifications and (ii) the fortifications were to be constructed by, to some extent, trained soldiers and ordinary people with no military background. The chamber record does not reveal the design of the fortifications or whether bastions, hornworks or half-moons were to be erected.

Of the three main materials taken from Mrs Fleet's house, timber would have been the most useful for creating palisades, gabions, sausages and storm poles, whilst stones and to some extent tiles could have been used to repair existing medieval defences. That the house was destroyed illustrates the impact that the construction of the fortifications started to have on the existing city – the landscape was being altered. Although in this case it was not a large-scale clearance, as it was only one structure, it set a precedent, as the record of 22<sup>nd</sup> December 1645 demonstrated.

In 1643, Townshend recorded 400 women working on the fortifications, demonstrating that, regardless of gender, the fortification of the city was a primary aim. The information gleaned from the historical records demonstrates the amount of organisation and effort that went into preparing the defences for the sieges of 1643 and 1646.

#### **7.5 Cartographic Analysis of Worcester**

Speed's 1610 map of Worcester (**Figure 105**) shows that the city was small, consisting of tightly cramped houses. Hills are depicted to the north and north-east, with the River Severn and shipping on the water passing the south-western area of the city. The east of the city is dominated by agricultural land. The medieval walls are shown to be intact and in good condition, particularly the eastern and northern sections.

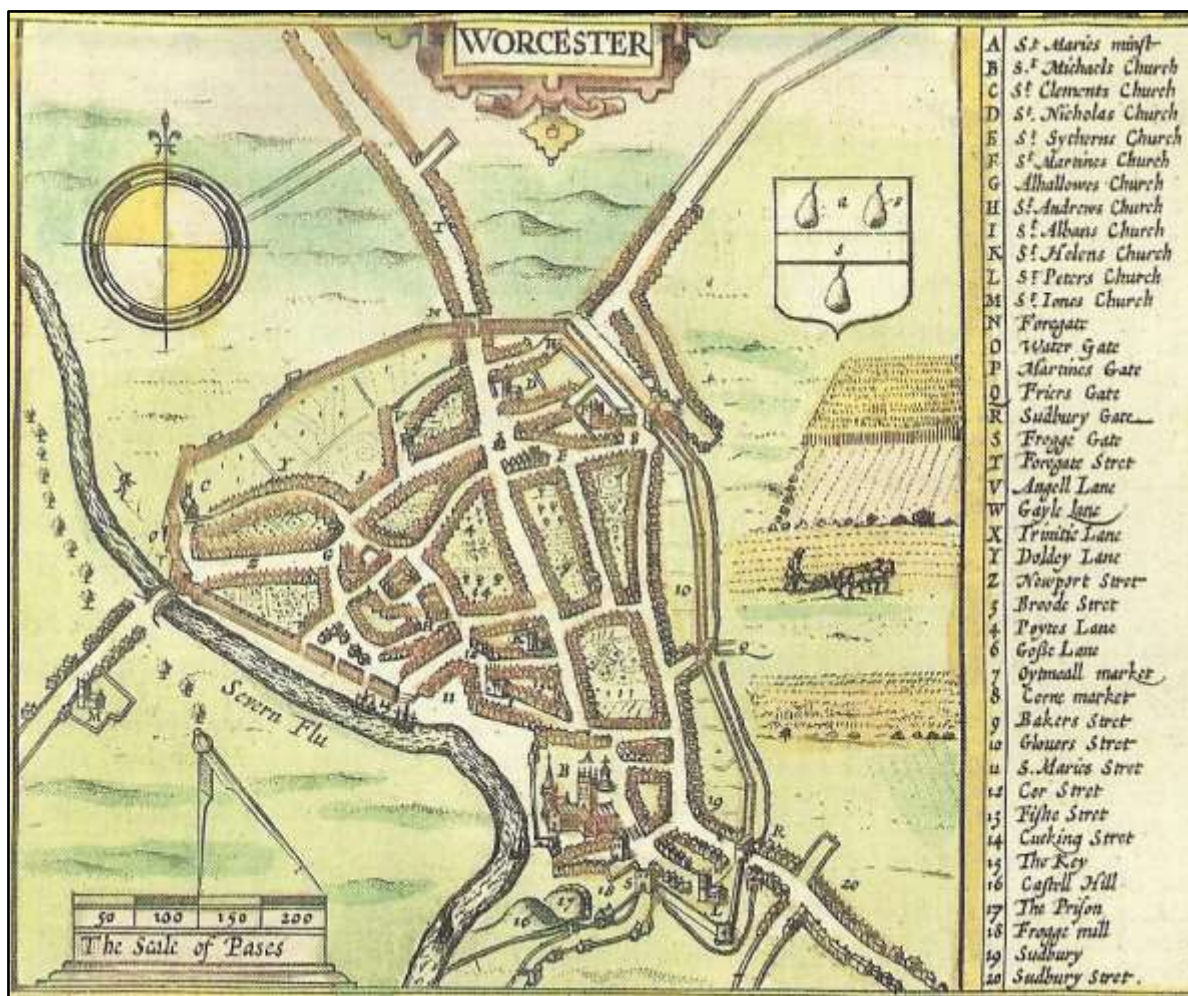
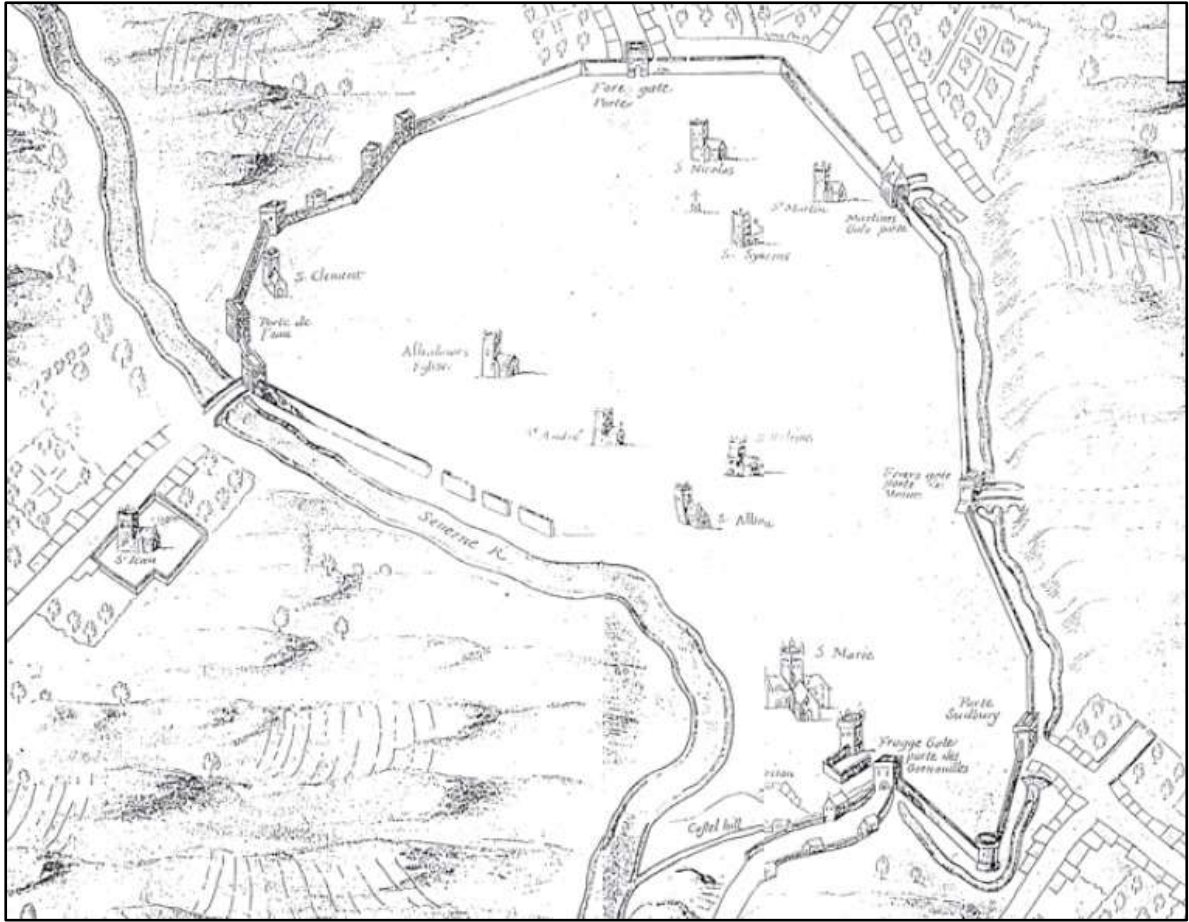


Figure 105: The city of Worcester as depicted by John Speed in 1610 (Hawkyard 1988, 191)

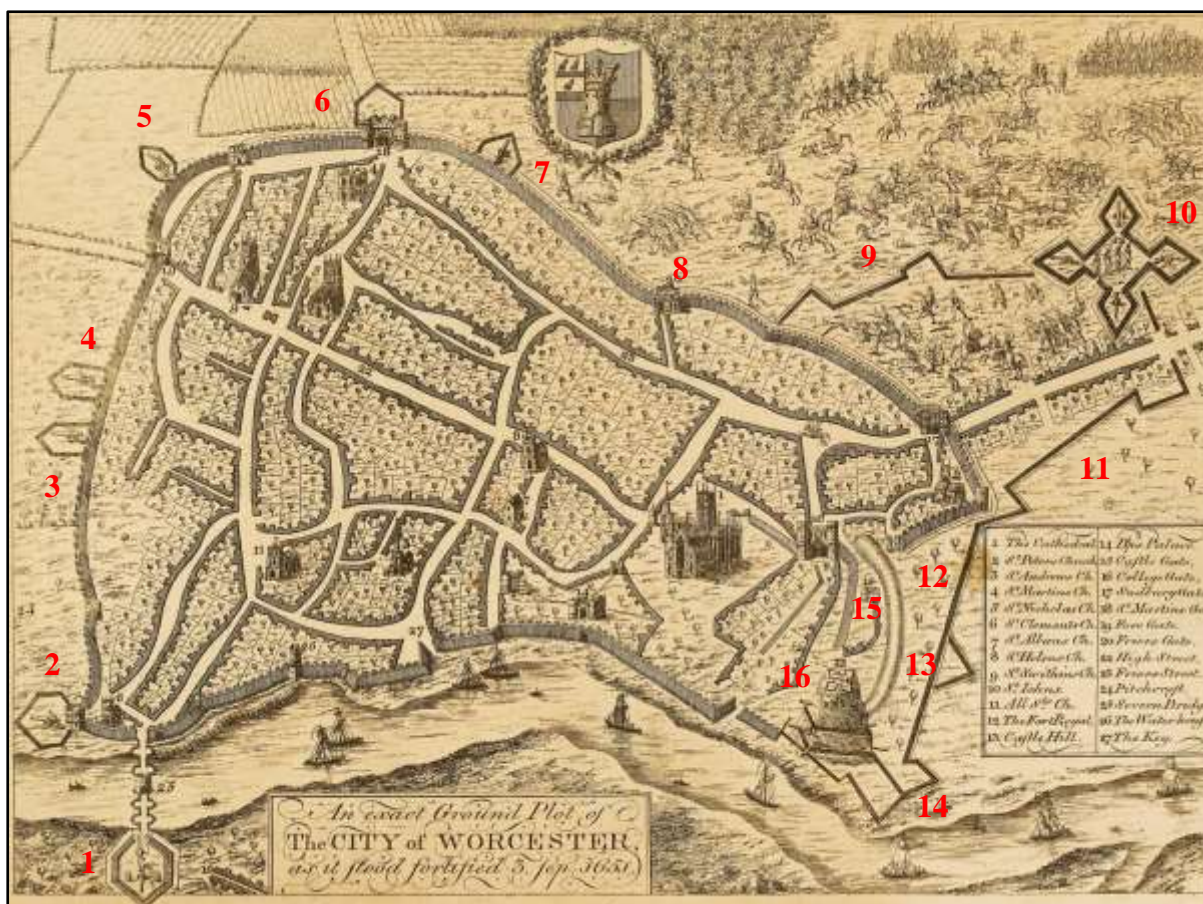
Along with Speed's (1610) map, another plan from an unknown source, referenced as an anonymous 1640s map of Worcester titled *c1650, Plan de Worcester* (as cited by Oxford Archaeology 2007, 16) (**Figure 106**) (according to Sheena Payne-Lunn, HER Officer, Worcester City Council, 2016, pers. comm., 7<sup>th</sup> January, the plan is held in the British Library under Image Number: D40104-78, Shelf Mark: Add 11564 Folio / Page No. 3), focuses its attention on the city walls and largely illustrates what the city would have been like during the conflict.





**Figure 106:** An anonymous 1640s map of Worcester showing defences (as cited in Oxford Archaeology 2007, 16)

Analysing 899.41, *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (**Figure 107**), along with similar versions (x899.426 4885(iv) and 6899.25 372), provides evidence of the extent of the fortifications during the Civil War. They are, however, reprints of the originals dating to c. 1723 and c. 1769 (Lesley Downing, Archive Assistant, Worcestershire Archive and Archaeology Service, 2015, pers. comm., 24<sup>th</sup> June). Three main routes are depicted entering the city. From the north via Foregate is The Tything, the modern A38. From the north-east entering St Martin's Gate is the modern B4205, and entering the city at the south-east is the A44 London Road.



**Figure 107: An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651.** Reference: 899.41 (digital copy provided by John France of The Hive, Worcestershire)

**Key to Figure 107:** 1 = the Causeway Bastion, 2 = St Clement's Sconce, 3 = The Butts Bastion, 4 = The Butts / Farrier Street Bastion, 5 = Sansome Street Bastion, 6 = St Martin's Sconce, 7 = the bastion south of St Martin's Gate, 8 = The Blockhouse / Friar's Gate, 9 = the entrenchment, Sidbury North, 10 = Fort Royal, 11 = the entrenchment, Sidbury South, 12 = the entrenchment, Severn Street / Diglis, 13 = Severn Street Bastion, 14 = Severn Street / Diglis Bastion, 15 = earthen bank?, 16 = Worcester Castle.

The Causeway Bastion over the old River Severn Bridge is of hexagonal shape and, depending on interpretation, has six bastion faces of equal length or four bastion faces at approximately 45° angles, interspersed with two equal length flanks facing east–west, with a surrounding ditch. The feature is not complete, with a small gap connecting the fortification to the bridge on its eastern edge. It gives equal status to covering all angles of attack and defence towards St John's and could also target the north-west area of the city and the sconce at St Clement's. If the map is stylistically correct, then this fortification may represent a lesser-

known style of fortification, being six-sided, although still depicted by the literature of the period, for example by Ward (1639, 39).

St Clement's Sconce is shown as connected to a five-sided, three-storey tower via acute angles of what appear to be small flanks. These flanks are in turn connected to two larger flanks heading in a northerly direction, which are coupled to the bastion faces. The placement of the fortification was designed to halt movement from the north and cover the River Severn to the west.

The Butts Bastion and the bastion at The Butts / Farrier Street are showed as connected to the city wall, which itself is on a slight curve towards Foregate. They have two flanks facing north and two bastion faces. The flanks are disproportionately long and are longer than the bastions. Strategically, the fortifications hold significant ground but are hampered by each other because they are only separated by a few metres. In a battle/siege, they would have been at a significant tactical disadvantage if either one had been captured. It also means that the besiegers' artillery bombardment could have afforded to have been less accurate on this part of the defences, as if their aim was off only slightly, they could have hit either one of the bastions. Perhaps the bastions were partly symbolic to ultimately hold the high ground.

The Sansome Street Bastion is located between Foregate and Trinity Gate (Baker and Holt 2004, 189). The placement of the fortification covers the north-east of the city. It is similar in design to St Clement's Sconce and the Causeway Bastion but much smaller in size. It should also be noted that from Trinity Gate, the city ditch appears.

From here, the city wall curves southwards past Trinity Gate towards St Martin's Gate and the sconce outside, which is facing east. Although the St Martin's fortification is termed a 'sconce', its cartographic appearance is that of a bastion. St Martin's Gate itself appears as an impressive feature with a large gatehouse flanked by two three-storey towers. The proportions of the flanks and bastion faces represent the period manual illustrations. However, this is the first fortification to not have an artillery piece inside it.

The bastion south of St Martin's Gate is offset from the curving city wall, facing south-east. The fortification contains an artillery piece, and the proportions of the flanks and bastion faces are similar to those of the bastion at St Martin's Gate, although slightly smaller in overall size. The city ditch is shown cutting through the fortification.

At the site of The Blockhouse / Friar's Gate, there is no evidence of additional defensive features, although the gate is shown as an impressive four-sided two-storey building with a series of crenellations.

Farther south, at a curvature in the city wall appears the Civil War entrenchment of Sidbury North, with a ditch to the east. From the curvature appears a bastion face directly from the wall heading south-east and joining a shorter flank heading south-west, giving an overall impression of a spur-like feature. A small rampart heads south-east towards a small flank and a demi-bastion, then onwards to another rampart heading in a southerly direction towards Fort Royal. This appears an overly complex series of fortifications because if the cartographic presentation is a true reflection of the features constructed, the venture would have been costly in terms of manpower to design and build and would have outweighed the requirements necessary to defend this area. None of these series of features is shown with artillery pieces.

The rampart of the Sidbury North entrenchment is shown entering the west bastion face of the northern bastion of Fort Royal. The design of Fort Royal reflects that recommended in the literature of the period, specifically the sconce design of Ward (1639, 88). Each bastion is shown containing an artillery piece, although the angle of the artillery does not cover any bastion face or flank; however, this may merely be artistic design, rather than tactical theory in operation. The west bastion is shown encroaching on the eastern properties along London Road.

The rampart/ditch heads from the south-west-facing rampart of Fort Royal towards London Road, breaks for that road and continues into a demi-bastion with a flank and rampart heading towards a tower on the city wall (and ditch) to the south of St Peter's Church. This area is known as the 'Civil War entrenchment, Sidbury (south)'.

From here starts the Civil War entrenchment feature of Severn Street / Diglis, which is a defensive bank and ditch system running towards Severn Street Bastion. The two bastion faces appear in design to represent a spur (having no flanks). The entrenchment continues towards the start of Severn Street / Diglis Bastion.

The Severn Street / Diglis Bastion system appears cartographically very complex. The initial design has a small flank emanating from the end of the entrenchment, with a small bastion face heading in a south-west direction. This appears to form a demi-bastion heading north-north-west. Two bank and ditch systems converge on this point. The first heads north-north-east towards a refortified Worcester Castle; the second heads north-west in the form a bastion face (overall forming a demi-bastion complex). At a point near the River Severn, the system turns and heads north-north-east, forming another bastion face, with a small flank heading towards the river, with a final defensive system curving around the ground level of the refortified castle towards the city wall, with a small flank offset from it. This multifaceted

design appears unnecessarily complex for the task of defending Worcester and would have required significant strategic planning and manpower to construct such a defensive sequence.

Returning to the convergence point, the defensive feature heads towards a refortified position with a series of bank and ditch systems, with storm poles and an artillery piece present. A motte is shown (remnants of the earlier medieval structure), with a small four-bastion sconce now on its peak. On the base of the motte, heading in a curve west–east beneath College Gate and on its way passing south of Castle Gate, is evidence of an earthen rampart. The rampart appears to intersect a small parcel of land.

Comparing this plan and Speed's (1610) map, the northern area of the city appears to have suffered the most destruction, with the suburbs of St Martin's Gate and Foregate Street illustrating almost total destruction. The scale of destruction was still raw in 1670, with a rental document noting that "all the houses without st martyns Gate were Bruned Down or Destroyed in the tyme of the Late unhappy warre" (BA36174 f.3).

A second version of *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (Reference: x899.426 4885(iv)) (**Figure 108**) illustrates small but significant changes in the fortifications of the city.

At the Causeway Bastion, the fortification is shown not connected to the bridge. The angle of St Clement's Sconce places the western flank of the feature closer to the River Severn. The road from Frog Gate is not shown, as it is concealed by a seal. Sansome Street Bastion is shown representing a design more similar to the manuals of the period, consisting of two flanks and two bastion faces, removing the two small flanks emanating from the wall. The feature itself is shown as separate to the city wall. The city ditch is shown starting from St Martin's Sconce and heading south, as opposed to the 899.41 version showing it emanating from Trinity Gate. St Martin's Sconce itself is illustrated as slightly smaller, as is the bastion south of St Martin's Gate. The Blockhouse / Friar's Gate shows small, insignificant stylistic changes. The Civil War entrenchment, Sidbury North, shows a minor change in angle. Fort Royal is shown as being slightly smaller than on the other plan. The final sections of the plan, including the entrenchment, Sidbury South; the entrenchment, Severn Street / Diglis; Severn Street Bastion; Severn Street / Diglis Bastion; and Worcester Castle, are similar in plan to 899.41. Whilst the earthen bank follows the same direction, it does not appear as wide in plan.







An exact Ground-Plot of the City of  
**WORCESTER**  
as it stood fortified Sept 1641

The following are the names of the places marked on the map:

- 1. The Castle
- 2. The Church of St. Andrew
- 3. The Church of St. James
- 4. The Church of St. Peter
- 5. The Church of St. Paul
- 6. The Church of St. John
- 7. The Church of St. Mary
- 8. The Church of St. Elizabeth
- 9. The Church of St. Anne
- 10. The Church of St. Agnes
- 11. The Church of St. Ursula
- 12. The Church of St. Catherine
- 13. The Church of St. Barbara
- 14. The Church of St. Thome

216

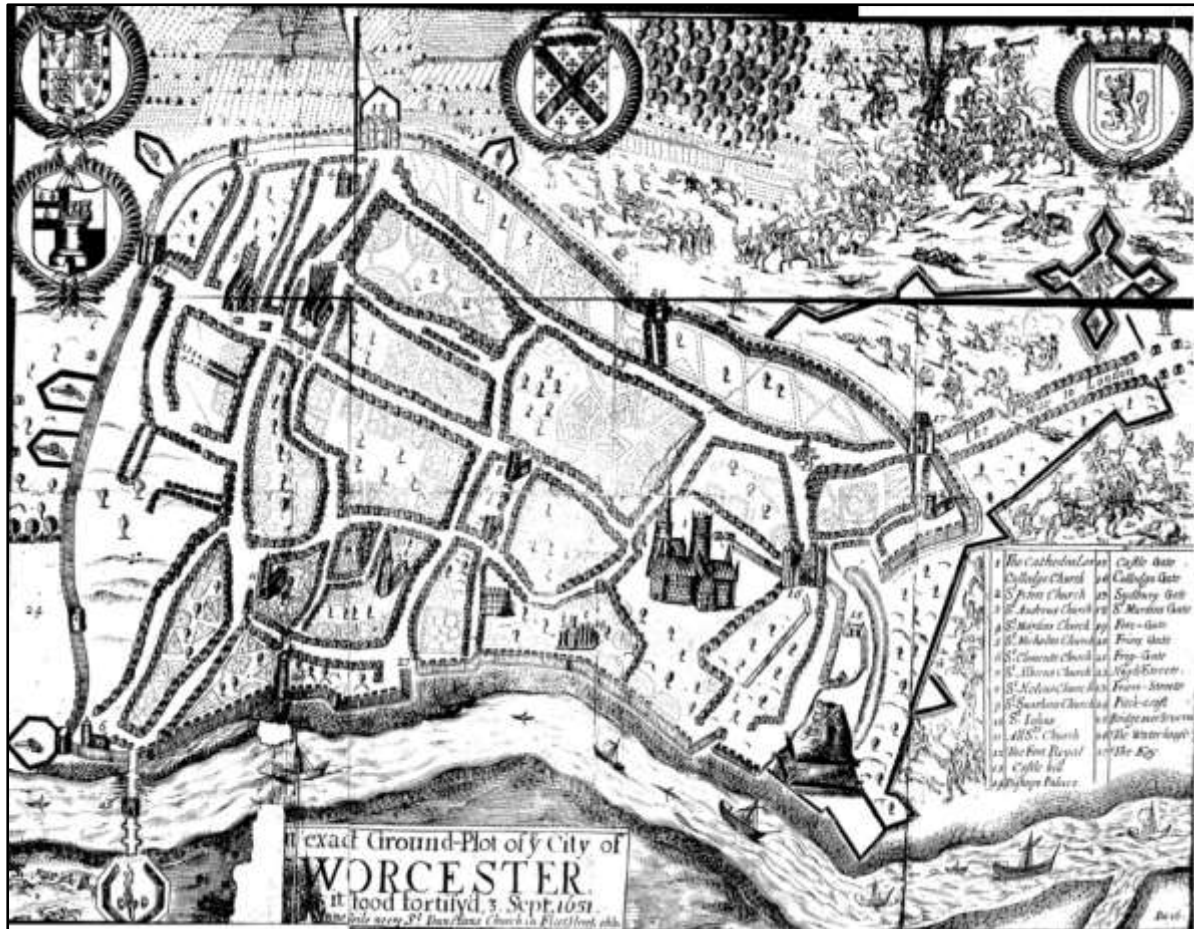


Figure 110: Boscobel's map of Worcester (Blount 1662, between pages 13 and 14, digital merged together by author)

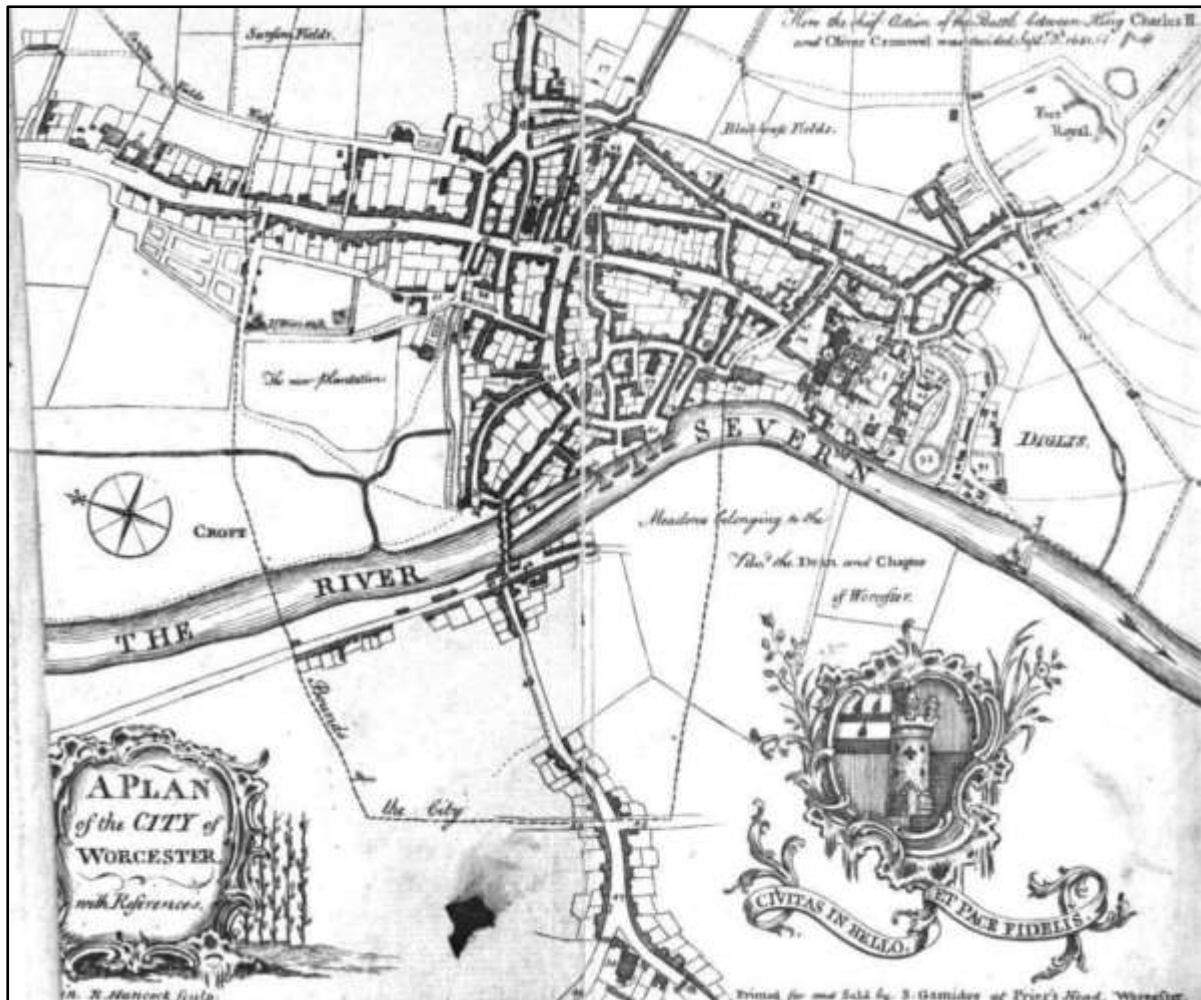


Figure 111: Post- Civil War plan of the city of Worcester (Green 1764, plates between pages 236-7, digitally merged by author)

Published in 1742, 100 years after the start of the Civil War, Doharty's map (**Figure 112**) contains inscriptions of place names: *Pitch Croft* to the north-west, *Blockhouse Fields* to the east and *Diglis* to the south-west. The cartographer's use of these names denotes the survival of these features in the landscape. Of interest is *Blockhouse Fields*, as this relates to the Civil War blockhouse. The area to the north of the medieval city and the defensive walls at The Tything and Foregate Street (Baker and Holt 2004, 148, 150) shows evidence of restoration and regrowth after the Civil War destruction. The map also illustrates evidence of where the 1651 Battle of Worcester occurred.



**Figure 112:** Extract of John Doharty's 1741 plan of the city of Worcester (Reference: BA 3156 x899:31, Worcestershire County Council's *Mapping the County* CD)

There is no evidence for the survival of the sconce over the west end of the bridge, St Clement's Sconce, the bastion at The Butts, the bastion at The Butts / Farrier Street, the bastion at Sansome Street, St Martin's Sconce, the bastion south of St Martin's Gate or The Blockhouse at Friar's Gate.

However, there appears to be evidence for the survival of part of a western section of a spur (see **1** on **Figure 113**). This section is west of the Commandery and is depicted on the map as a line with trees. Further evidence of the possible survival of defensive features is illustrated as two avenues of trees running north-west to south-west towards Fort Royal (**2**). At the time of the Civil War, this would have been an earth and bank system, possibly the covered way illustrated on Noake's (1879) plan. Fort Royal itself is not depicted as a four-bastion sconce but as a semi-circular feature with two lines emanating north-east and south-west, suggesting that the landscape had been altered. This is at odds with Noake's (1879) plan, but this can be explained because Doharty's map was a plan of the whole city and not a site-specific plan.



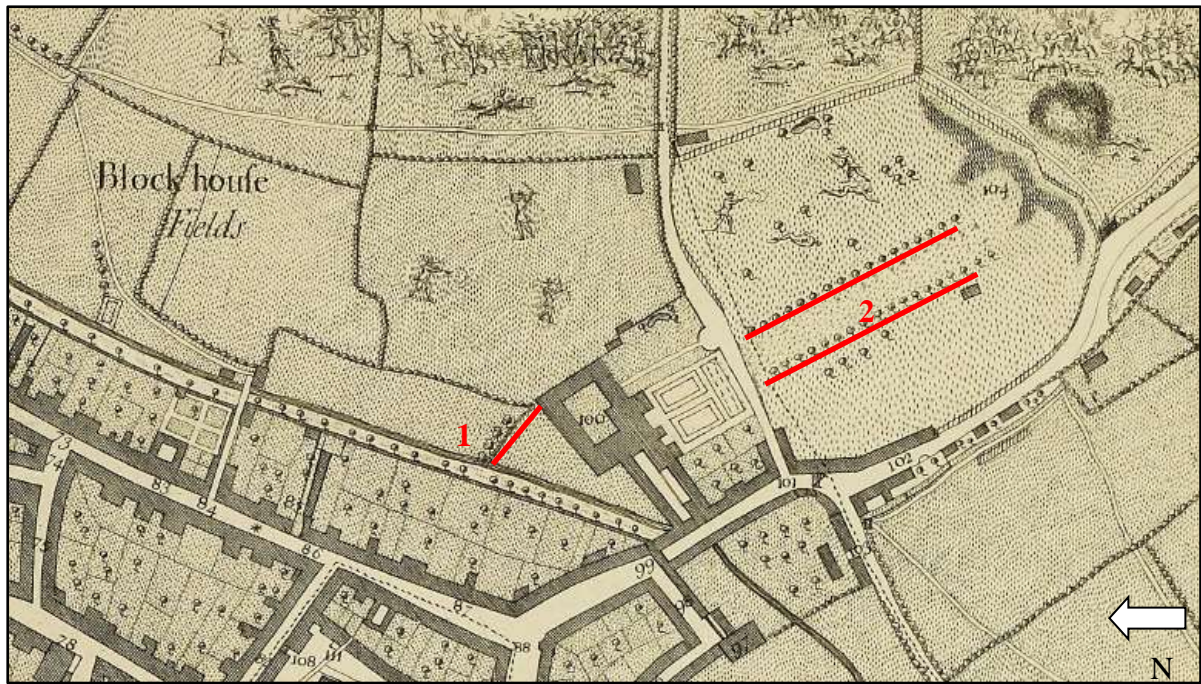


Figure 113: Extract of John Doharty's 1741 plan of the city of Worcester (Reference: BA 3156 x899:31, Worcestershire County Council's *Mapping the County* CD)

To the south of the city wall appears some evidence for the survival of a bastion system / spur (3) to the south of Castle Hill; 4 illustrates a tree line, which appears to indicate the survival of an earthwork line (Figure 114). This may be the ditch or vallum on Noake's plan heading in a south-west direction. If 3 and 4 are the vestiges of the Civil War fortifications, they represent a less complex system of defences than represented on 899.41 510, 899.41, x899.426 4885(iv) and 6899.25 372.



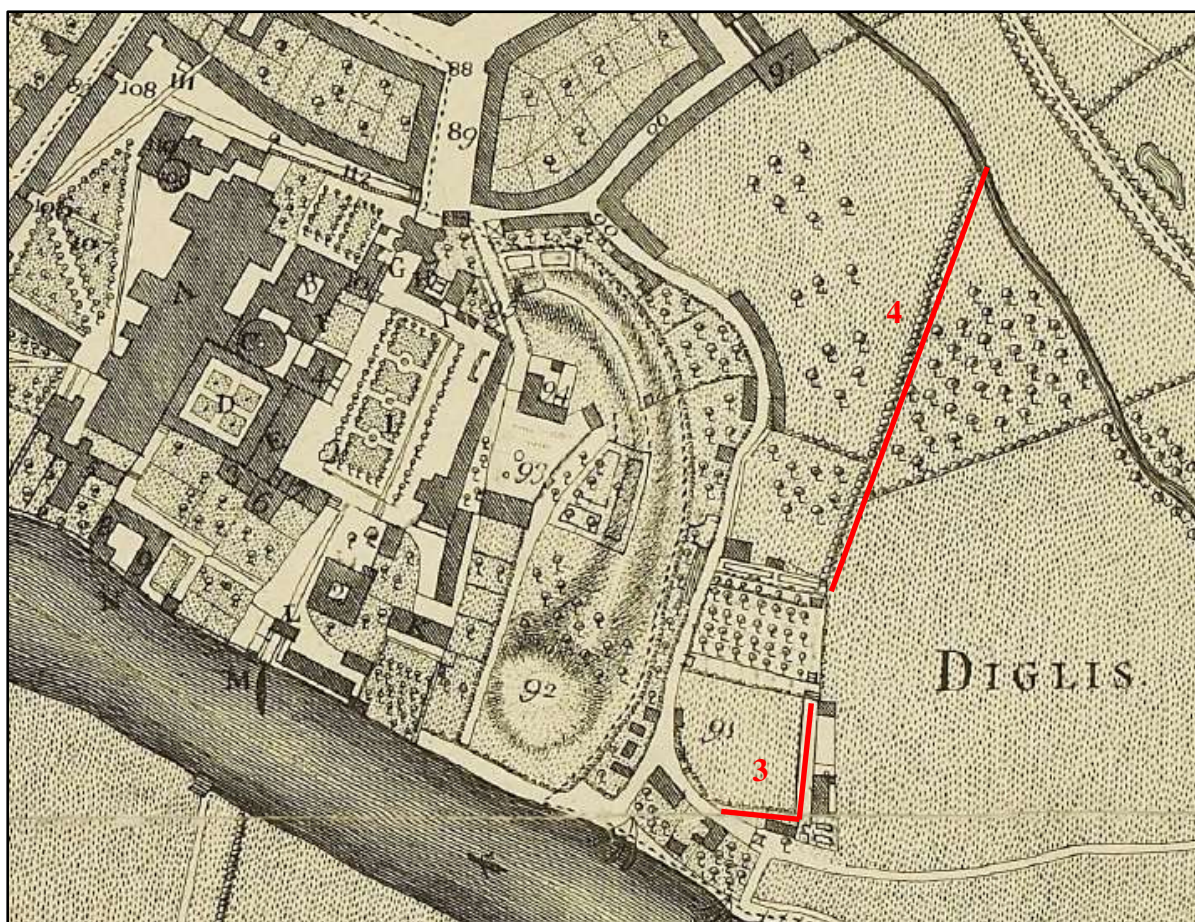


Figure 114: Extract of John Doharty's 1741 plan of the city of Worcester (Reference: BA 3156 x899:31, Worcestershire County Council's *Mapping the County* CD)

In 1808, Roper and Young published a map of the city of Worcester (**Figure 115**). The map denotes the former bridge over the River Sever, where on the west side a sconce was placed. In addition, it shows the location of the city wall but without any evidence of St Clement's Sconce, the bastion at The Butts, the bastion at The Butts / Farrier Street, the bastion at Sansome Street, St Martin's Sconce, the bastion south of St Martin's Gate or The Blockhouse at Friar's Gate. As with Doharty's (1741) map, reference is made to *Blockhouse Fields* and the 1651 Battle of Worcester.





Figure 115: Extract of the plan of Worcester (Roper and Young 1808, Reference: BA 3672 / (xxi), Reference: x899:31)

After the *Blockhouse Fields* inscription, evidence of a demi-bastion/spur (1) and an earthwork line (2) interjected with a spur (3) is illustrated heading in a south-south-east direction towards Fort Royal, which is given a different orientation to that on Noake's (1879) plan, with the north and south bastions heading north-north-west to south-south-east. It further differs, as only two ditches/banks are shown protruding from the fortification. The second ditch (4) heading south-west from the fortification protrudes from the (largely) west-facing bastion. There is no covered way. The map also illustrates evidence of a continuation of the fortification's defensive line (5) in the form of a bastion face and flank heading towards Castle Hill. In this line, there is no evidence of a spur. Potentially, the line heads south-south-west and forms a further defensive feature at almost right angles (6). This then continues in a northerly direction with the River Sever to the west and Castle Hill to the east (7) (Figure 116).

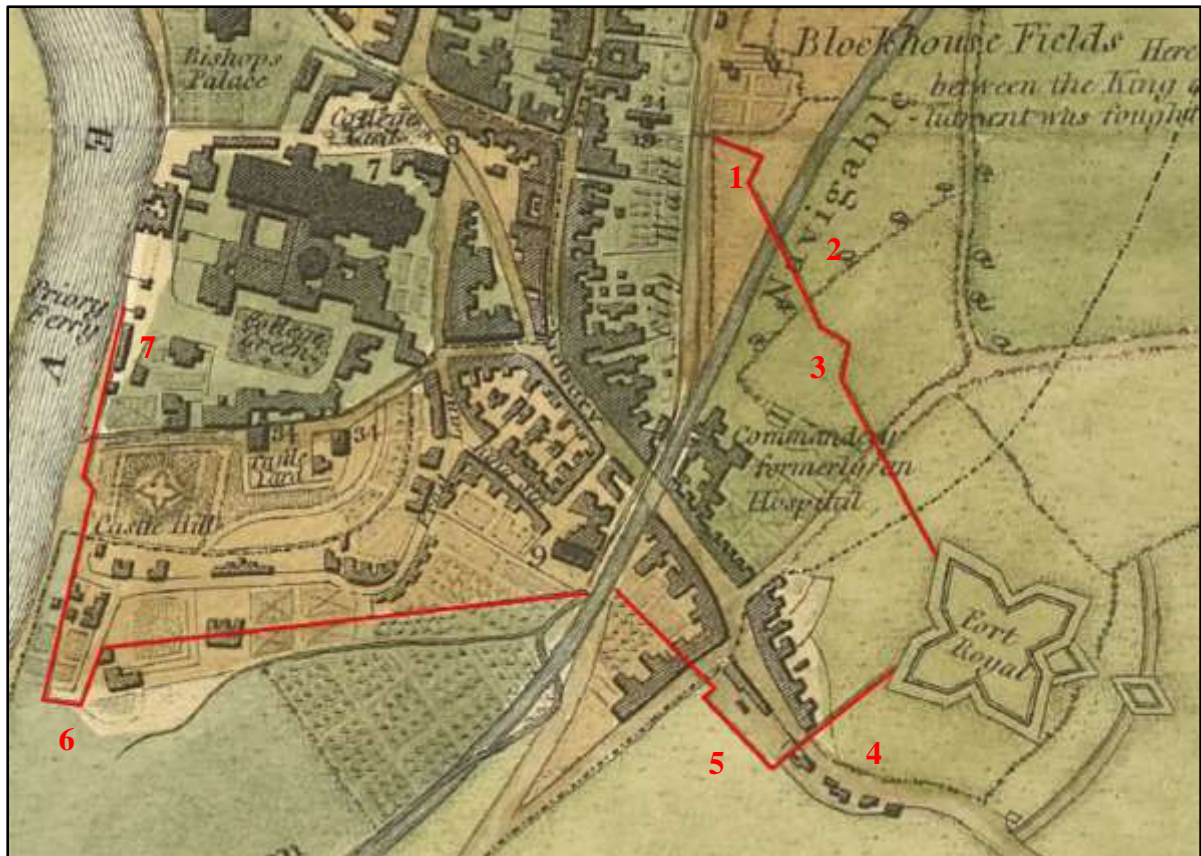


Figure 116: Extract of the plan of Worcester, showing the potential survival of Civil War fortifications (outlined in red) (Roper and Young 1808, Reference: BA 3672 / (xxi), Reference: x899:31)

Noake's 1879 plan of Fort Royal (**Figure 117**) shows it as a fortification containing four bastions, with flanks of the same length and angle heading towards two bastion faces of the same length and angle to create a symmetrical figure. The faces of each bastion meet the four points of a compass. The angles of the flanks appear to be obtuse. The map illustrates the north bastion as the most significant, as the left-sided northern bastion face has a ditch meandering north, with a covered way heading in a north-west direction (presumably a bank and ditch feature containing an entrance to the fortification) from the rampart wall to the Commandery site. An additional ditch is illustrated heading south-west from the corner of the rampart from the left side of the southern bastion.

The location of Fort Royal is significant, as it overlooks London Road to the west up towards the site of Sidbury Gate. Overall, the plan shows a precise, accurate sconce fortification with a complex series of additional features (ditches and a covered way), which illustrates how Fort Royal was interlinked with the surrounding defences and was part of a wider and complex set of fortifications designed to defend the city.

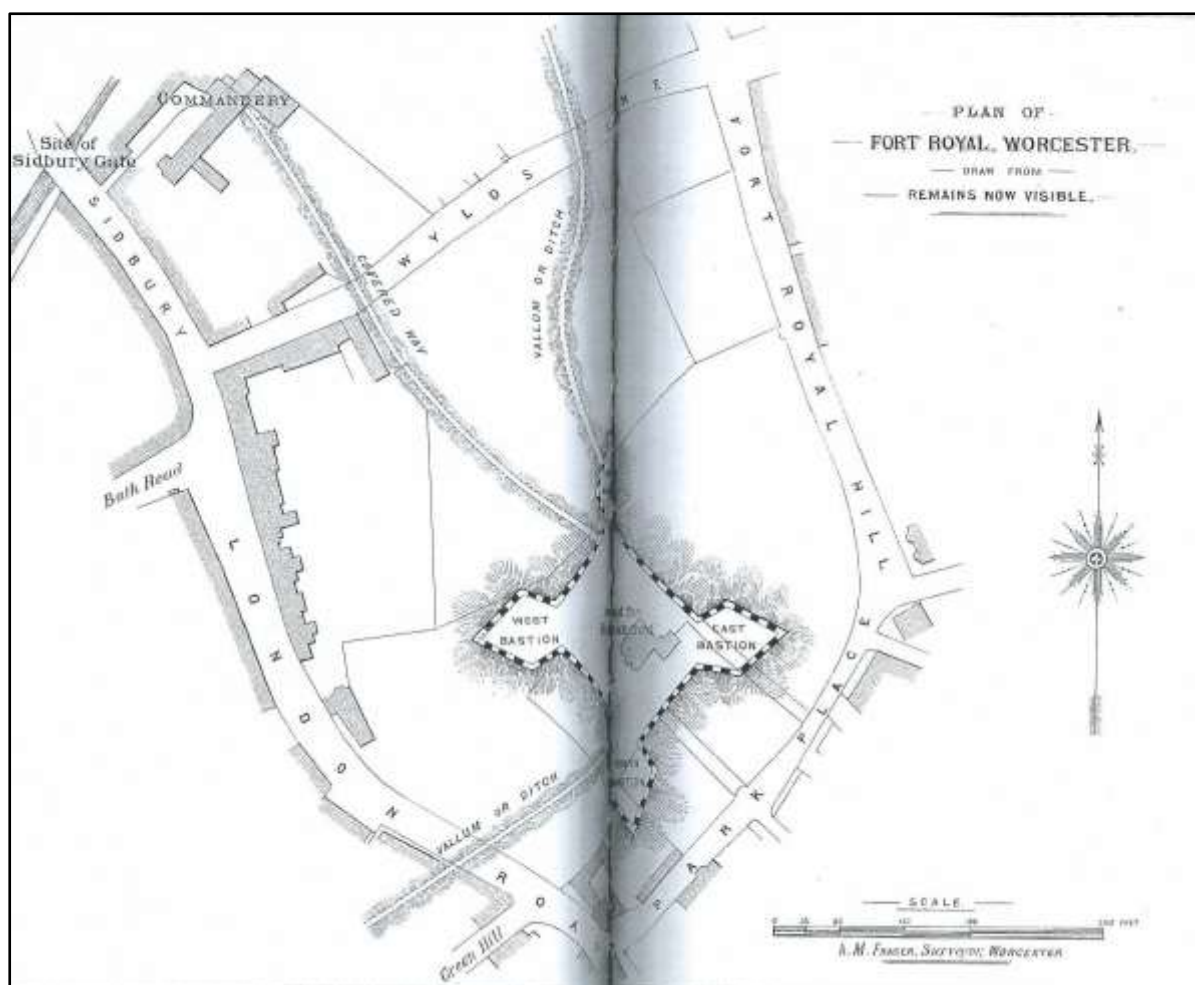


Figure 117: Plan of Fort Royal (Noake 1879, between pages 60 and 61)

### 7.5.1 1:10,560 First-Edition Ordnance Survey Map

The source does not depict any evidence for the survival in the landscape of the bastion at the Causeway, St Clement's Sconce, the bastion at The Butts, the bastion at The Butts / Farrier Street or the bastion at Sansome Street. There is also no evidence for St Martin's Sconce or the bastion south of St Martin's Gate. No evidence is illustrated of The Blockhouse at Friar's Gate. There is, however, evidence of the sconce at Fort Royal (**Figure 118**). The map does not illustrate any evidence of the bastion at Severn Street or the bastion at Severn Street / Diglis. Worcester Castle is also not depicted, but mention is made of the castle gardens.



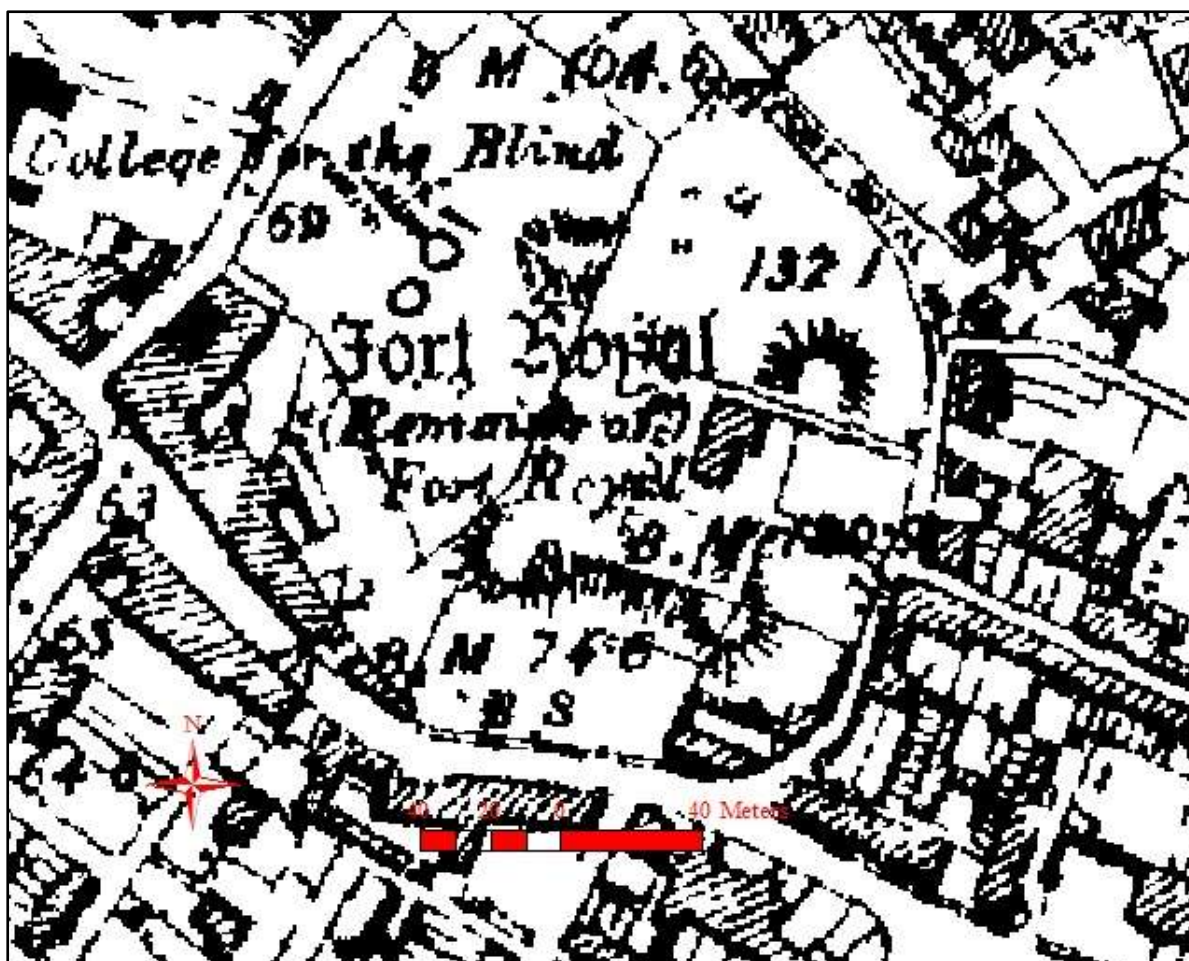


Figure 118: Extract of the 1:10,560 Ordnance Survey Map at 1:2,000 scale, depicting the sconce at Fort Royal and four bastions (Historic Digimap © Crown Copyright and Landmark Information Group Limited (2016). All rights reserved (1846–1899)).

Ross's 1887 plan (**Figure 119**) appears to be very similar to the three depictions of *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (References: 899.41, x899.426 4885(iv) and 6899.25 372). It shows the fortifications sited in similar positions. Unlike 899.41 but similar to x899.426 4885(iv) and 6899.25 372, there is no road heading geographically north from Foregate.

Stylistically, the city ditch to the south of St Martin's Sconce turns to surround the bastion south of St Martin's Gate and south from Friar's Gate, encompassing the fortifications at the entrenchment, Sidbury North; Fort Royal through the entrenchment, Sidbury South; the entrenchment, Severn Street / Diglis; Severn Street Bastion; and the two bastion faces of Severn Street / Diglis Bastion, terminating where the fortifications reach the River Severn.

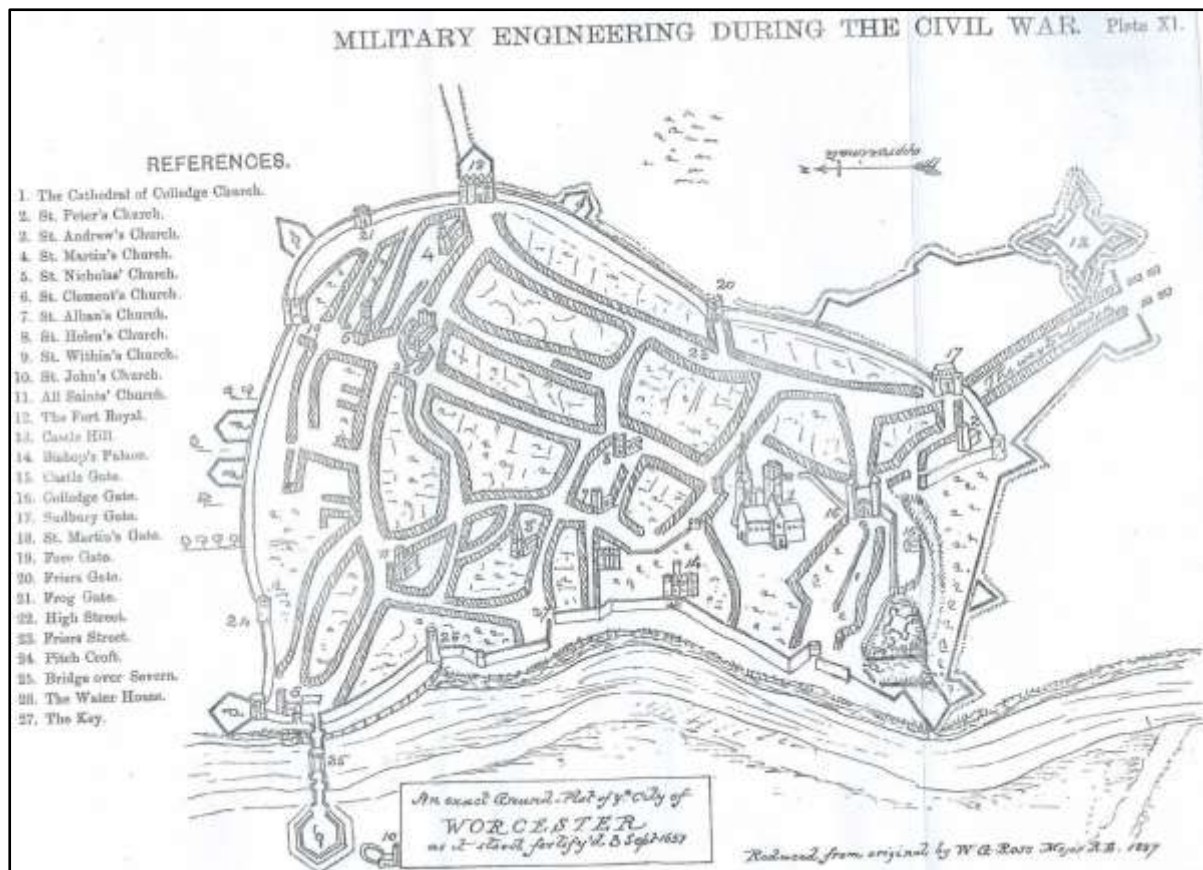


Figure 119: Plan of the city of Worcester (Ross 1887, Plate 11)

Overall analysis of the cartographic sources, particularly *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (References: 899.41, x899.426 4885(iv) and 6899.25 372), illustrates a series of bastions that appear to have features more in common with the hornwork fortification depicted by Ward (1639, 48) (**Figure 10**) and the half-moons demonstrated by Ward (1639, 48) (**Figure 13**). Whilst this evidence suggests that the fortifications do not differ from the ones depicted in the manuals, it is more probable that the defenders were not looking to construct hornworks and half-moons at these positions and, as suggested by Atkin (1995, 56), the scale of the drawn features does not represent the reality of the ones constructed. Therefore, the plans clearly have a significant element of artistic licence, distorting the actual fortifications constructed; however, there are no contemporaneous drawings and/or depictions to confirm the exact design and construction of the fortifications, expect for the survival of specific elements, for example Fort Royal.

## 7.6 Archaeological Evidence of Worcester

### 7.6.1 Sansome Street Bastion

Four boreholes were sunk at 16 Sansome Street, roughly perpendicular from the city wall line and over the city ditch. Boreholes 1 and 4 showed evidence indicative of a berm (in this case, a flat area between the wall and the city ditch), illustrating the parallel line of the city ditch and the wall. Boreholes 2 and 3 did not show this. This indicates a change in the course of the ditch, suggesting the location of the Civil War bastion (Woodiwiss 1997, 1).

### 7.6.2 Severn Street Bastion

Area C of the excavations conducted in 2009 at Royal Worcester Porcelain on Severn Street revealed evidence of Wall (1021). The location is significant, as it is only metres from the medieval city wall. The wall consisted of three grey sandstone blocks, two brick courses and a tile, all bonded together with a thin pinkish mortar. However, whilst Wall (1021) appears to be on a similar trajectory to the Civil War defences, it is too small in stature to have been an effective defensive feature (Milbank 2009, 12, 19, Figure 9).

Excavations in 2012 conducted at 42 Severn Street revealed a medieval ditch that was recut during the Civil War. The backfill of the ditch was consistent with the feature being filled in soon after the war, with the lack of bioturbation and the presence of medieval artefacts and roof tiles possibly illustrating the destruction of medieval properties to give defenders a good line of sight (Daffern *et al.* 2012, 1).

Near the southern area of the evaluation trench, a sondage located three deposits. The first fill encountered (32) was a firm silty clay and appears to have been redeposited alluvium, not a change in the fluvial organisation, and contained large pieces of roof tile. Fills (33) and (34) were both mid-pinkish-brown in colour. At maximum extent, Fill (33) was 1.18m thick and contained charcoal and pottery, whilst Fill (34) contained no finds, suggesting that it was redeposited natural (**Figures 120 and 121**). Environmental evidence indicated that the ditch (a U or V shape) was largely open and surrounded by rough grassland. In 1643, the Parliamentarians used the now destroyed buildings on the site of Diglis House to hide in. The suburb was destroyed by the Royalists between 1644 and 1646, further demonstrating the strategic and tactical decisions made by commanders to hold the city for the king (Daffern *et al.* 2012, 6, 15, 21, 24, 26). This information illustrates that the task of excavating the ditch would have been extremely difficult. Firstly, Fill (32) contained roof tiles, indicating demolishing and clearing the existing structures, whilst Fill (33) contained charcoal, which can



be inferred as indicative of burning, further demonstrating the demolition of these structures. Context (34) represents the infilling of the ditch after the Civil War.

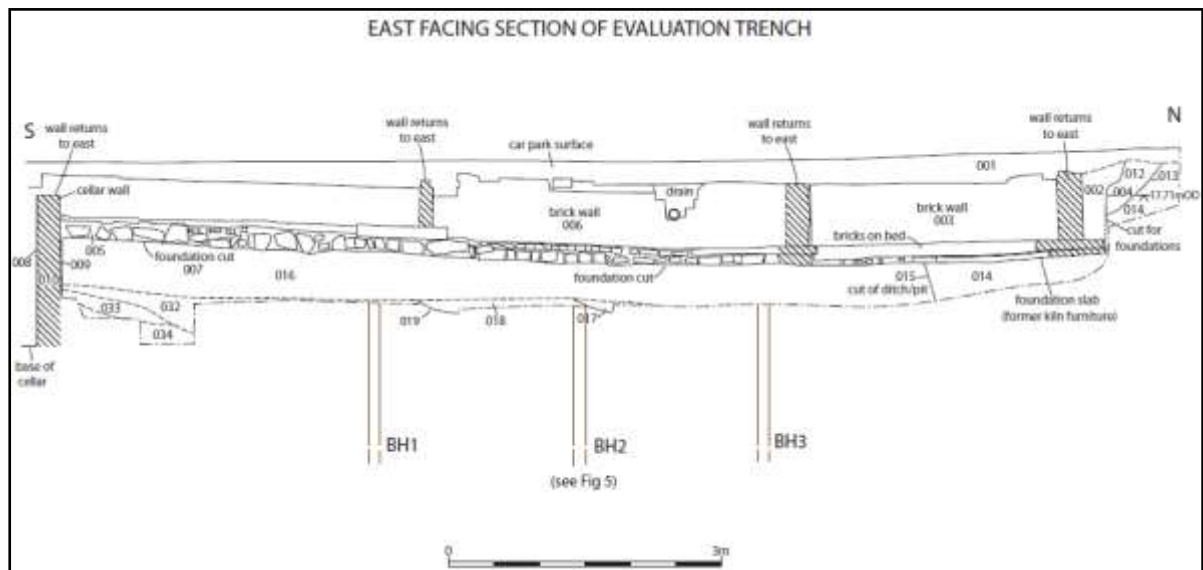


Figure 120: East-facing section, illustrating Fills (32), (33) and (34) (Daffern *et al.* 2012, Figure 3)



Figure 121: During excavation photograph, illustrating Fills (32), (33) and (34) (facing east) (Daffern *et al.* 2012, Plate 9)

### 7.6.3 Bastion at Severn Street / Diglis and Civil War Entrenchment

The Royal Worcester Porcelain site lies by the Frog Brook, which was a former tributary of the River Severn, with the area known as ‘Diglis’ presumed to have been marshland in the medieval era. Two bastions are recorded as being constructed, with the Frog Brook being deliberately dammed to flood the surrounding area (Lovell and Pike 2004, 6, 8, 10). This illustrates that the people constructing the defences utilised the natural wet immediate hinterland to make crossing and launching an attack on this area even more difficult after traversing the River Severn.

During the first Civil War, a mill at Frog Lane was destroyed and the mill’s pond dried up; however, houses were being constructed in the upper and middle areas of the lane (Sherlock and Feryok 2004, 23). This illustrates the destruction of the industrial areas, which would have been important to the city’s economy, and the quite rapid reconstruction and regeneration of the area.

St Alban’s School is located on raised ground near the River Severn in Frog Brook Valley, where a former millstream ran (now Severn Street) and where the bailey of Worcester Castle once stood to the south of the cathedral estate (Jackson 1991, 1; Napthan 2001, introduction). Excavations appear to have revealed evidence of a U-shaped ditch, 25 feet (7.62m) wide and 8 feet (2.43m) deep, with fill from the north suggesting a bank and a trench, with palisades located parallel to the ditch (Barker 1968/1969, 99; Jackson 1991, 1–2; Sherlock and Feryok 2004, 27). The archaeological evidence demonstrates a significant feature cut into the landscape, with the fill from the ditch being utilised to create a bank/rampart. Evidence of palisades may represent a further attempt to fortify the landscape by preventing cavalry from being able to jump the ditch.

Pits 8 and 9 revealed evidence of a ditch (Context (12)) (**Figure 122**) that contained a variety of fills at the centre; these appear to have been redeposited from the north. The ditch had an east–west alignment and was at least 10 m in width but was only excavated to a depth of 1.5m. The position of tip lines suggests that the ditch would have been significantly deeper. Contexts (13) and (14) are raised above the northern edge of ditch, perhaps indicating that a bank or rampart was created from the spoil of the ditch and was later used to fill in the ditch after the war (Jackson 1991, 3–4).

The excavations by Barker (1968/1969) and Jackson (1991) appear to show evidence of an entrenchment, as suggested by Atkin (1995, 60–61), which includes an outer glacis bank (**Figure 12**), storm poles and a firing step. This is significant evidence, as it demonstrates a complex fortification system, rather than the basic construction of a ditch and bank system.

Creating an outer glacis bank and a fire step and the placing of storm poles show that this was a significant construction and that whoever constructed it was aware of modern techniques.

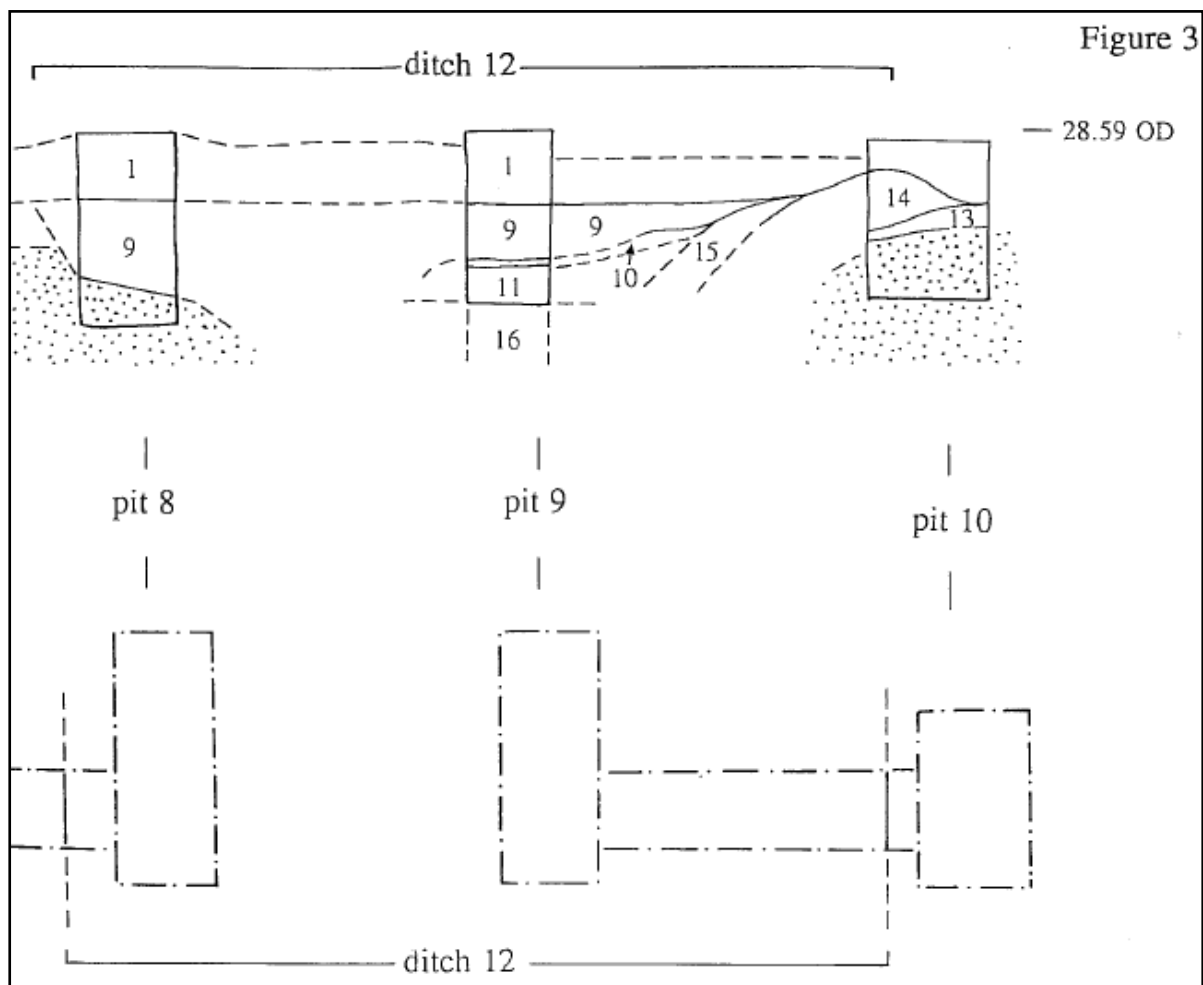


Figure 122: East facing section illustrating ditch (12) (Jackson 1991, extract of Figure 3)

A watching brief was conducted in 2001 at St Alban's School. Test Pit 2 revealed Contexts (204), (205) and (206), which were wet soft grey silty clay with occasional mortar and flecks of charcoal. All three contexts revealed small amounts of clay tobacco pipes, dating to the late 17<sup>th</sup> and early 18<sup>th</sup> centuries. Due to the limited scope of the excavations, later post-medieval deposits might have been concealing a Civil War cut/feature (Napthan 2001, 6.6, 8.1). This suggests that there was significant activity in the area post- Civil War, with perhaps an attempt to level the landscape to conform to later 17<sup>th</sup>-century and early 18<sup>th</sup>-century redevelopment of the vicinity.

#### 7.6.4 The Bastion at The Butts

The word ‘Butts’ is derived from the Middle English word *butte*, “which means an irregularly shaped end piece of land. A piece of land, perhaps, in this case cut off by the building of the city wall in the 13<sup>th</sup> century” (Whitehead 1996, 4). The land is referred to as “gravell buttes” (Bond 1974, 107) in the chamber record of 1<sup>st</sup> March 1609/10, when Edward Sowley was granted permission to build a house by the town ditch near St Clement’s Gate (Bond 1974, 106–107). The Butts contained a well for service to the local population, which, according to Whitehead (1996, 4), was damaged during the conflict and needed replacing in 1661. An ineffective water supply could have damaged attempts to maintain a healthy fighting force and cattle; however, as the well only needed replacing in 1661, the damage might not have been that significant.

In 1992, an evaluation at The Butts located evidence of a significant ditch in Contexts (111) and (207). Located in front of the city wall, the ditch was medieval in origin, with dimensions of a minimum of 3.5m deep and 16m wide. It had a bowl-shaped slope towards the base, with an alignment suggesting that it ran parallel to the city wall. These dimensions, particularly the depth, would surpass the period literature’s recommendations (**Table 1**), illustrating significant effort and determination to secure this position. Although only 1m in an east–west alignment was observed, the ditch was cut into the natural and gravel at its southern edge. The ditch was at least 5.5m away from the city wall. The medieval wall was truncated, probably as a result of the restoration during the Civil War. The ditch had a different profile to the east of the city, where it had a flat (not concave) bottom, although the profile “may be somewhat distorted if the auger transect crosses the ditch obliquely, however it clearly demonstrates that the ditch here is not flat bottomed” (Jackson 1992, 9) (**Figure 123**) (Jackson 1992, 1, 4, 6, 7, 9, 10).

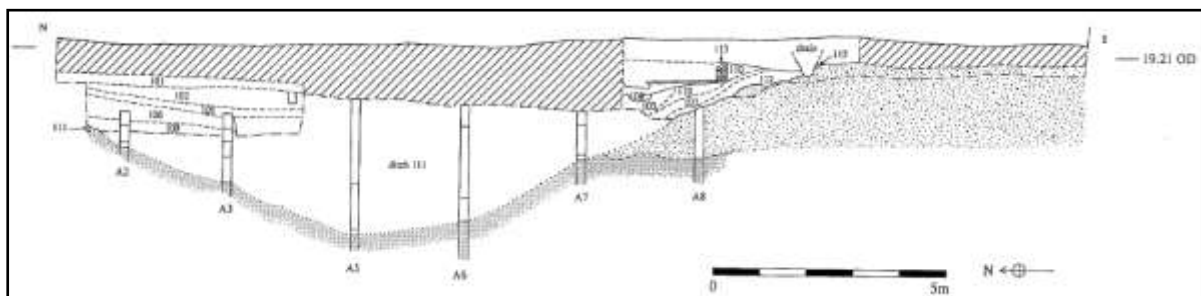


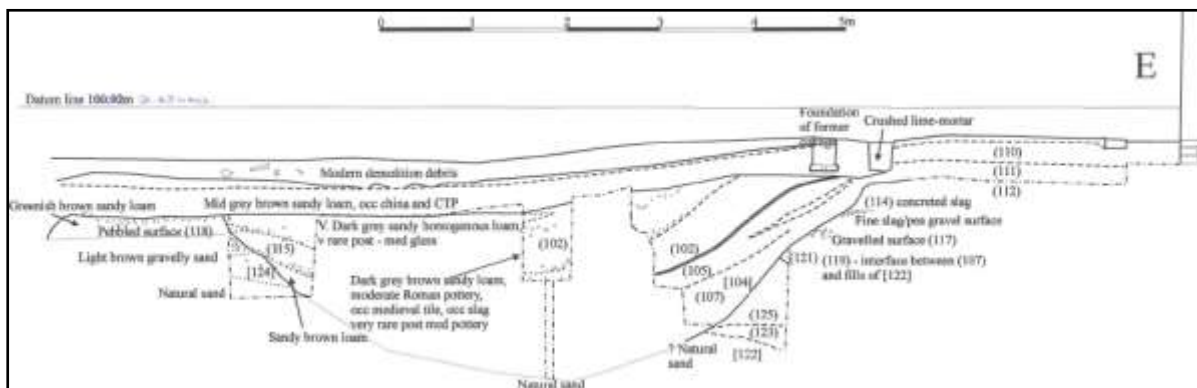
Figure 123: The Civil War ditch (Context (111)) in Trench 1 (Jackson 1992, Figure 4)

Context (204) demonstrated that the ditch was filled in fairly soon after the war. The context appears to have been material removed from the ditch when it was recut in the Civil War and then redeposited again back into the ditch (Jackson 1992, 9).

Evidence was located illustrating that buildings were destroyed to improve the defences of the city (Jackson 1992, 9). This information illustrates the immense impact that the fortifications had on the city, in this example reducing its size and providing the besieged people with new defences.

Further excavations were conducted at 3–5 The Butts in 1997–1998. The site was adjacent to the excavations conducted by Jackson (1992). The research revealed that the recutting and cleaning of the ditch during the Civil War removed all but one undated context of the ditch's medieval origin. It can be inferred that the section of ditch located in these excavations had a similar profile to the one excavated by Jackson (1992) and that the abundant environmental evidence of waterlogging suggests that the ditch was the city ditch (Bretherton and Pearson 1998, 3, 5–7).

An evaluation at 8–12 The Butts revealed a significant cut context (Context (104)) of a south-west to north-east ditch *c.* 4m wide and 2–2.5m deep (**Figure 124**). One fill context (Context (107)) contained medieval tiles and rare post-medieval pottery. Later fills contained little artefactual evidence, with lower fills being designated as topsoil, suggesting a redeposited bank/rampart, which suggests that the ditch was part of an earthen bastion (Napthan 2003, 6.6, 8.5).



**Figure 124:** The south-facing section of Trench 1 and Cut [104], demonstrating the significant ditch around a bastion (Napthan 2003, extract of Figure 8)

Salvage recording was conducted at Barrels Wine Bar on Angel Row. Post-medieval deposits were most frequently uncovered with dumps of material located behind the city wall,

which have been interpreted as evidence of attempts to stop cannon shots. Medieval deposits were infrequent, suggesting that the site was significantly altered in the post-medieval period, probably during the conflict. Significant amounts of roof tiles (602g) and mortar fragments were located. Contexts (41), (43), (44), (45) and (46) contained varying quantities of mortar (light pinkish), bricks and roof tiles and occasional flecks of charcoal, indicative of burning and suggesting the demolition of buildings during the preparation of defences and the clearance of a field of fire (Lockett *et al.* 2001, 1, 5, 8, 9, 14, 19, 20). This information is significant, as it illustrates the impact that the construction of fortifications had on the landscape and cityscape of Worcester.

Whilst evidence of burning of the suburbs is known from the historical record, the archaeological evidence illuminates and adds to that record by creating a complete picture of the events that occurred. With the militaristic events taking place, the archaeological record brings to the forefront the evidence of civilian involvement in the conflict (Harrington 2004, 58–59). The significant amounts of roof tiles and bricks signify what was destroyed, and the inclusion of charcoal flecks show the reality of destroying some buildings to protect others and human beings. This case, and indeed the archaeological evidence of burning, with a 3cm burnt layer discovered at the 1988 excavations on Southgate Street at the Bank of England site in Gloucester, illustrates the important social and political factors (Rakoczy 2008, 1) that influenced the destruction in both these cities. The “human condition” (Rakoczy 2008, 2) affects how people react to the destruction of their own structures and landscapes. For example, the people who lived and worked in Gloucester and Worcester would have had very different reactions and emotions to destroying their cities than to the destruction caused by the slighting of Pontefract Castle, situated north-east of the town of Pontefract in West Yorkshire, where it was first Parliament, then the West Riding Committee and finally the local government of Pontefract (after the committee had outlined some requirements) who were responsible for its demolition (Rakoczy 2008a 262–263).

### **7.6.5 Powder House, Angel Place**

A watching brief was conducted in 2002 at Angel Mall, Angel Place. The area appears to have been an orchard belonging to the Blackfriars in the medieval period, and from 1623 to c. 1800 was a burial ground. It was noted that there was a small building in the north-east of the study area used to store powder during the Civil War; however, Trial Pits 3 and 4 do not appear to have been positioned to examine if archaeological evidence of that feature had survived (Cullen 2003, 4, 5, 7).



An evaluation conducted at the Angel Hotel, Angel Place, revealed interesting information. Cartographic evidence shows that Angel Place is adjacent to the area of Worcester known as ‘The Butts’. Contexts (105), (106), (107) and (108) were loose and uncompacted and consisted of redeposited gravel and sand intertwined with layers of grey and grey-brown sandy loam. The tip lines were irregular and sloped to the south at a sharp angle. It is suggested that these contexts illustrate a hurried series of defensive features using local materials or levelling around 1652, contradicting evidence from earlier excavations at 3–5 Cornmarket (Napthán 2006, 7.4, 7.5). This illustrates that, in certain sections, medieval defences were being strengthened by using earth (something criticised by the engineer Papillon (1645, 11–12)); however, as the material was loose and uncompacted, the archaeological evidence suggests that it was extremely hurried, with no attempt to compress and complete the task to a high standard, perhaps because it was a ‘last ditch’ attempt to fortify the city.

On 19<sup>th</sup> March 1646/7, it is recorded that William Greene should have lease of a house at “Angell lane” (Bond 1974, 430) and to invest “£80 in buildings within three yeares” (Bond 1974, 430). This information suggests two things: firstly, that Angel Lane is now Angel Place, so it can be inferred that this is the land adjacent to The Butts, which underwent significant transformation during the siege; secondly, the leasing of land with a condition of investing money and rebuilding the area shows that the alteration was so significant that property was destroyed to such a degree that independent investment was required to restore the area to its pre-war state.

The area of land on Bath Road is situated to the east of the River Severn. In 1646 and as a result of the continuing siege, whilst the city wall was bolstered, the suburbs in this area were destroyed (WSP Environmental 2003, 5). A further desk-based assessment by Barnes (2005, 5) demonstrated that the meadows north-east of medieval Powick Bridge at Lower Wick involved a major skirmish when Prince Rupert’s forces retreated from the city on 24<sup>th</sup> September 1642. The destruction of a suburb continues to demonstrate the impact that preparation for the siege / the construction of fortifications had on the landscape of Worcester.

Excavations conducted in 2003 at Brooklyn Ford, Bath Road, revealed no evidence of Civil War defensive features (Sherlock *et al.* 2003, 3, 21), despite being inside an area that was destroyed due to the conflict. However, the absence of evidence does not suggest that the area was not affected; it does illustrate the ephemeral nature of Civil War archaeology.

Excavations conducted at the back of 23–24 Foregate Street revealed no evidence of pre-17<sup>th</sup>-century date, which corresponds with the area being cleared during the Civil War. Context (105) was a 2 m plus deposit of soil containing 17<sup>th</sup>- and 18<sup>th</sup>-century pottery, tiles,

bricks and charcoal fragments with a small lense (Context (108)). The deposit sat upon the natural geology at 20.78m aOD. Phear suggests that this deposit arrived after the area had been amended (**Figure 125**) (Phear 2009, 1, 6, 11). The evidence reveals two important points. Firstly, clearance for the preparation of a field of fire was significant. The archaeological record reveals no evidence of pre-17<sup>th</sup>-century date, suggesting complete sterilisation of the area, removing each feature/artefact, no matter how insignificant. This demonstrates how important it would have been to the besieged to have a clear view of who/what was approaching. Secondly, due to the importation of soil, Context (105) demonstrates an attempt to alter and relevel the landscape (Phear 2009, 11), which suggests an endeavour to conceal the destruction and modification caused to the landscape by the creation of a desolate setting, in this case the field of fire.

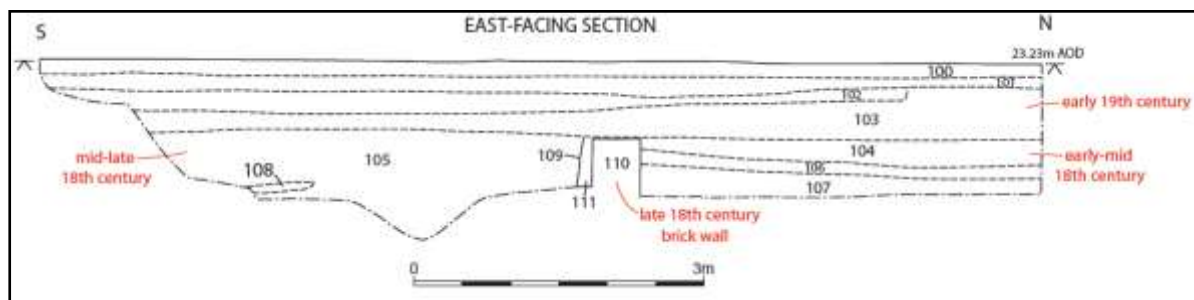


Figure 125: Trench 1 at 23–24 Foregate Street (Phear 2009, Figure 3)

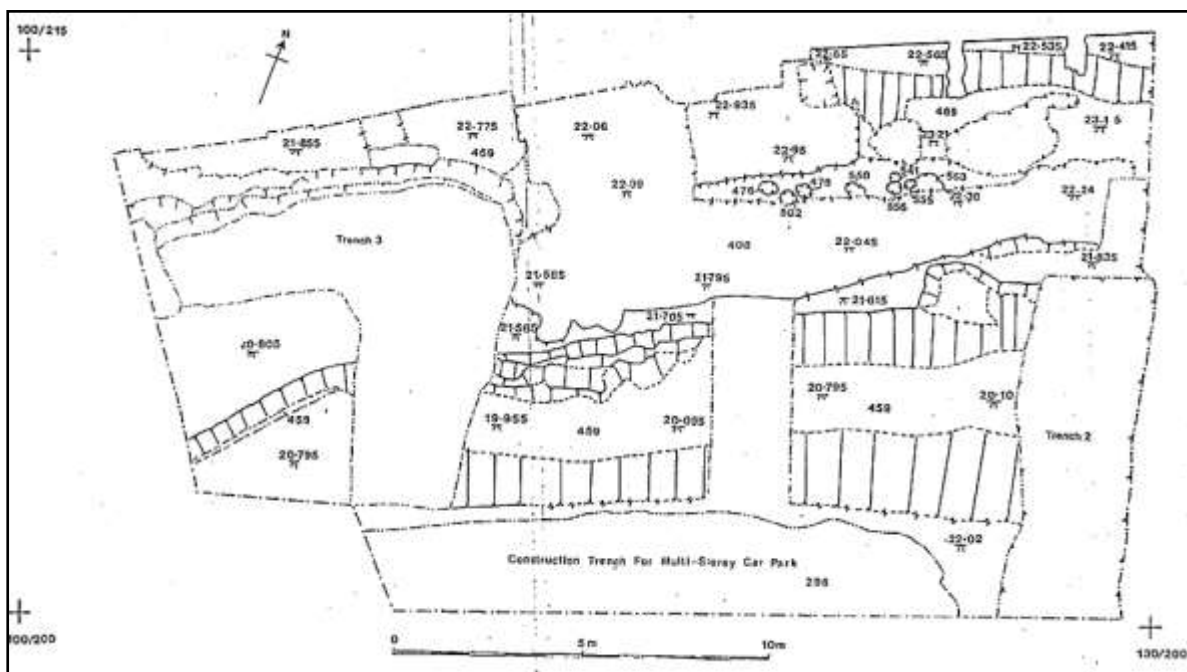
The Foregate suburb was destroyed during deliberate slighting combined with the construction of a sconce, with Whitehead (1996, 5) suggesting that the sconce was positioned at The Butts to protect the Holy Well water source. The ‘blind’ described by Townshend was positioned behind the city ditch. The ditch was dammed near St Clement’s Gate and was prone to holding stagnant, dirty water, so much so that there were discussions by the chamberlains to redirect the water and therefore the ditch to Barbourne Brook. Tensions during the siege were naturally high, with grass from Pitchcroft being gathered to feed cattle grouped in front of the ditch (Whitehead 1996, 6).

The damage caused by the 1646 siege was significant. Many houses, including those of the chapter and dean, were destroyed (Whitehead 1996, 6). On 12<sup>th</sup> March 1646/7, Richard Saunders was granted a 21-year lease for £4 10s at Little Pitchcroft “in consideration of leavelling the workes raised upon the same” (Bond 1974, 429). This is no doubt reference to the sconce constructed at The Butts (Whitehead 1996, 6).

### 7.6.6 The Trench at Blackfriars

Excavations at Blackfriars, which is located between Dolday and The Butts and south of the medieval city wall, were conducted in 1985. Trench 2 located evidence of a ditch (Context (132)) running east–west, measuring 6m in width and a maximum of 1.6m in depth. Although small in scale, this has been interpreted as reinforcement of the medieval city wall during the conflict. The same ditch was located in Trench 3, although evidence of recutting and the feature being shallower was observed. Interestingly, the bank, which in the east section was up to 1.7m in height, comprised redeposited marl, gravel, sand and silt underneath a layer of pebbles comprising the base (Mundy 1985, 3, 5, 7). Mundy (1986) states that documentary research has revealed that Henry Townshend recorded this work taking place on 12<sup>th</sup> or 13<sup>th</sup> June 1646.

In Trench 6, a quarry was located, being 25m long, 5m wide and 1.5m deep. The material recovered from the quarry was used to create a bank to the north and to the south. Eight post/stake holes were identified, along with pottery of Civil War date. As the quarry was refilled very soon after it had been opened, this has been interpreted as being the refortification of the medieval defences during 1646. A bank was also constructed on the south side, which later became part of a property boundary connected to other buildings (**Figure 126**) (Mundy 1986).



At Site 4 of Powick Lane North, numerous post-medieval pits were recorded. As they were cut from 1m higher than the medieval surface, this suggests that the site was covered in soil, perhaps during the Civil War (Mundy *et al.* 1989, 24).

#### **7.6.7 The Bastion at The Butts / Farrier Street**

A linear ditch was located during excavations between 1988 and 1992 on Farrier Street. The finds from the ditch did not exclusively date the ditch to the Civil War period, although the feature does not appear on later cartographic material. The fact that the ditch was stepped in profile and 0.70m in depth may indicate that it was not a significant Civil War defensive feature (Dalwood *et al.* 1994, 82, 108).

#### **7.6.8 St Martin's Sconce**

Excavations were conducted in 2000 on a small area of land at the intersection of St Martin's Gate and City Walls Road, located just outside the medieval city wall within the St Martin and Silver Street suburb and near to the former course of the Frog Brook. The discovered north-south-aligned, 5m wide, deep post-medieval ditch (F2/F21, F9 and F17) was not related to the boundaries of any properties, suggesting that the feature may date to the Civil War. An excavated section revealed that it was steep-sided. The upper layers were complex, making the original size and depth difficult to determine; however, the lower layers contained artefacts from the late 17<sup>th</sup> century containing rubble, bricks, tiles and mortar. It is possible that this ditch was part of a bastion feature emanating from the city wall (Dingwall and Ramsey 2002, 1, 6, 27). This ditch might have been the same as that identified by Dalwood *et al.* (1994, 108) on Farrier Street, which might have been a ditch for the face of a bastion.

Evidence of a medieval tile house was located during the watching brief in the north-west corner of the site on modern-day Silver Street. Sandstone foundations may represent earlier foundations of the building or robbing of the city wall (Dingwall and Ramsey 2002, 27).

Excavations in 2009 conducted on Lowesmoor Trading Estate, located at the corner of St Martin's Gate and City Walls Road, revealed a significant ditch. The ditch cut (Cut [8004]) revealed three fill contexts (Contexts (8005), (8006) and (8007)) and a section of the ditch context (Context (8008)), which were able to demonstrate that the ditch had an east-west configuration. Pottery from the 17<sup>th</sup> century was also discovered. This ditch appears to be the same as that discovered by Dingwall and Ramsey (2002, 6, 27) (Miller 2009, 5, 6, 10).

Cut [8008] is defined as the ditch cut (**Figure 127**), whilst Contexts (8004), (8005), (8006) and (8007) are described as fills (Miller 2009, 38). Proposing that Context (8004) was the first fill to be excavated and was described as “Grey brown silty sand compact but friable with red tile fragments”, the fact that it was compact and contained red tiles suggests quick preparation of a rampart when combined with the evidence of Context (8005), a moderate compact clay with other fills (Contexts (8006) and (8007)) (Miller 2009, 38).



**Figure 127: Civil War ditch; Cut [8008] demonstrates the steepness of the ditch (Miller 2009, Photograph 8)**

Excavations on Lowesmoor Trading Estate between 2010 and 2011 revealed evidence of a Civil War ditch for a bastion. The last dateable post-medieval layer was backfilling of the ditch that surrounded St Martin’s Sconce. The layer contained significant amounts of tiles, suggesting that the sconce and ditch were constructed on a site that was once a tilehouse, with historical evidence illustrating that houses in the Lowesmoor area, outside the city wall, were destroyed to create a field of fire. Lower stratigraphy suggests that the ditch was waterlogged and therefore prone to flooding. Environmental evidence revealed that the ditch was freshly dug, with plant remains growing on the sides of ditch suggesting this. Pollen evidence revealed significant quantities of grass, suggesting meadowland, and small amounts of birch, oak and



willow. Fungal spores demonstrate that livestock were likely to have been kept in the area. Evidence of wheat, oats and carrots may represent unsuitable crops being dumped. The only evidence to date the ditch to the Civil War was the stakes (**Figure 128**). An assemblage of pottery revealed domestic wares and evidence of industry with metalworking in the suburb before the construction of the ditch and sconces. At its maximum, the ditch was 9m in width and 3m in depth and was aligned east–west, with a distinctive turn to the south. Evidence of postholes on the northern side suggests that a further structure might have been supported on the external section, possibly with a glacis. The base of the ditch was at 18.24m aOD (**Figures 129 and 130**) (Woodiwiss 2014, 1, 4, 7, 10, 36–37, 42–43, 45, 46–47, 60).

The width of the ditch appears to conform to the manuals of the period and exceeds the depth of ditch suggested (**Table 1**), illustrating in part a deviation from the recommended dimensions, although this evidence represents an understanding of prevalent theories of the time when constructing defensive positions.



**Figure 128:** A stake recovered from the Civil War ditch (Woodiwiss 2014)



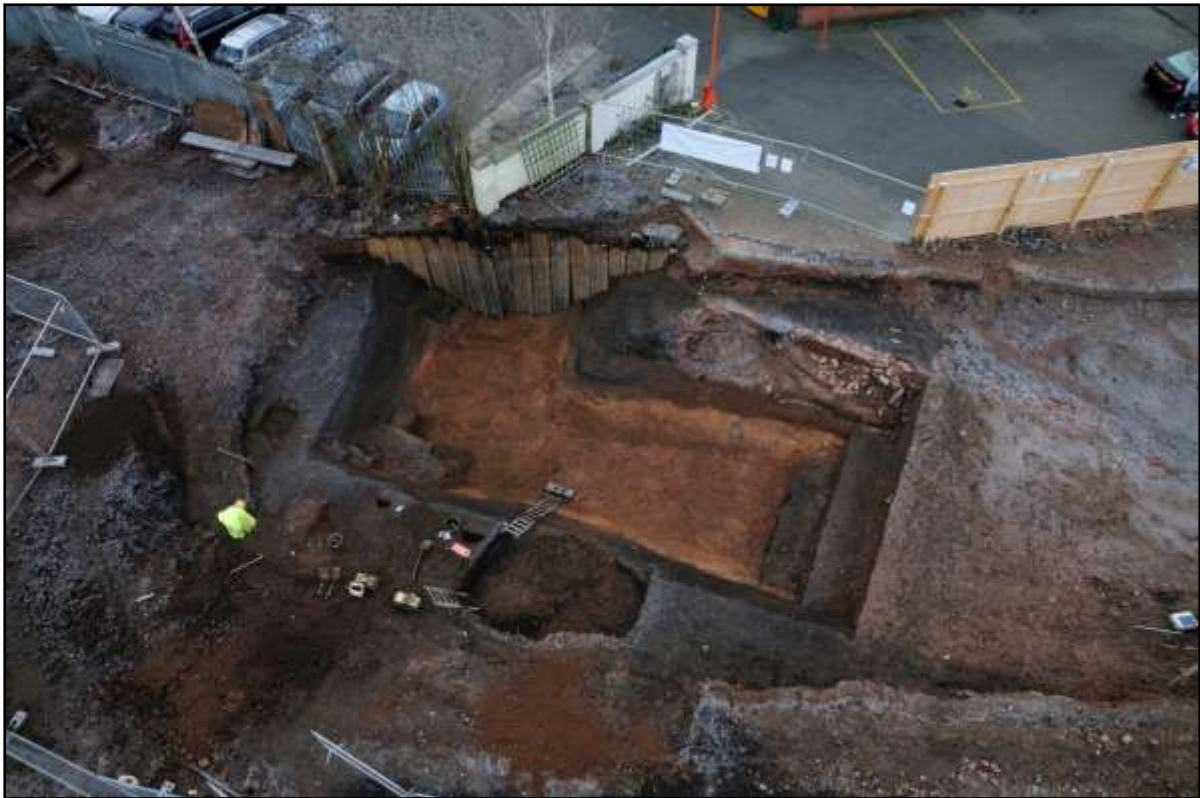


Figure 129: Civil War ditch constructed for St Martin's Sconce (Woodiwiss 2014)



Figure 130: Civil War ditch constructed for St Martin's Sconce (Woodiwiss 2014, Plate 13, page 37)

### 7.6.9 St Clement's Sconce

Henry Townshend reported that a blind was made between St Clement's and Foregate, and Atkin (1995, 62) dates its construction to 23<sup>rd</sup> July 1646. Townshend stressed that planning had been a problem and that the people in charge should not have waited "to the last hour of necessity" to construct defences (Willis Bund 1915, 134). Using poles, rafters and hurdles, a 15 feet high (5 yards) (4.57m) and 30 yards (90 feet) (27.43m) long barrier was made with earth and horse dung. It was located on the "brow of the hill to prevent the enemy's clearing the wall from their works at St John's" (Willis Bund 1915, 134). Townshend suggested that the blind would have made a useful addition to site ordnance and muskets (Willis Bund 1915, 134). Atkin (1995, 62) advocates that Townshend misinterpreted the axis of the feature, which would have ran in a north-south direction (not east-west). Atkin also suggests that the archaeological excavations at the trench at Blackfriars in 1985 appear to demonstrate the 'last ditch' defences constructed behind The Cross. Townshend recorded that a "little work behind The Cross stockades between the Castle Hill and Mr Hall's garden wall was thrown up to stop the Enemy's passage if he should force the line" (Willis Bund 1915, 158). Atkin (1995, 62) suggests that Townshend confused the construction of a north-south blind connected to St Clement's Sconce and the east-west defensive ditch behind The Cross.

Townshend complained that the wall from Foregate to the blind had not yet been lined with earth and should have been 20 feet (6.09m) thick, with a of minimum of least 15 feet (4.57m); according to Atkin (1995, 62), it should also have contained a fire step at the rear. What work had been done on the wall was interpreted by Townshend as being insufficient. He considered this to be the weakest area of the city and stated that cannons could successfully fire shots 8 feet (2.43m) into earth, if not more, and that the wall as it stood was only 6 feet (1.82m) thick at the base and not lined at the top; thus, he states that the old wall would have been destroyed with every shot. He also suggests that two 'stonks' from Foregate to St Clement's should have been dammed to deter the enemy (Willis Bund 1915, 134). A successful blind could have been a tactical advantage if utilised as a platform for artillery and muskets. The blind that Townshend describes appears to be a rampart of some kind made of earth using poles, rafters and hurdles to create a strong defensive feature between Foregate and St Clement's (presumably starting and terminating at both medieval gates).

A watching brief and an evaluation were conducted at the former Cattlemarket site, of Croft Road and Dolday. Contexts (103) and (104) revealed sand and soil layers inside the church area of St Clement's, which have been interpreted as the abandonment of the church following damage during the Civil War. Trench 1 also examined the city wall and ditch, whilst

Trench 2 examined The Butts, but neither revealed evidence of the Civil War. Whilst Civil War earthworks were not located to the north of the city wall, it has been suggested that the reason that these layers were not uncovered was that they were below the remit of the work (Napthan 2001a, 2.1, 6.4.1, 6.4.6, 6.4.8, 6.5.4, 7.1.5).

#### **7.6.10 Fort Royal**

This four-bastion sconce was a small outwork during the first Civil War and was rebuilt into Fort Royal by the Royalist Scots in 1651. Originally, it would have been an earthen fort surrounded by a ditch, with a timber palisade on the ramparts (Atkin 2008, 31–32). Atkin (2008, 32) also states that an 18<sup>th</sup>-century plan shows a diamond-shaped bastion with a ditch cutting over London Road. Miller and Dalwood (2006, 4, 12) note that a trial trench excavation across the south-eastern ditch in 1969 recorded evidence that the ditches of the fort had been backfilled almost immediately after the Battle of Worcester. Based on Noake's plan (**Figure 117**), the surviving elements of the fortification are the west and south bastions.

#### **7.6.11 Worcester Castle**

During the Civil War, the castle became a strategic part of the defences and had a new lease of life after its medieval decline. Described as a 'mound', stockades fortified what survived of the castle (Beardsmore 1980, 57).

Excavations in 2007 of the castle ditch showed that it was still a significant feature during the Civil War, measuring 17–18m wide and at most 7m deep. Severn Street, previously known as 'Frog Lane', had small dwellings in the 1500s, affecting the ditch of the former castle. The ditch inside the city wall was filled in; however, the ditch outside remained open to allow water to flow from the Frog Brook. A mill on the land was destroyed in 1643 to make way for defences. Sometime after the Civil War, the watercourse was blocked to stop flooding into the castle ditch, with attempts to re-establish the mill unsuccessful. No evidence dating to the Civil War was recovered (Napthan 2007, 1, 4).

An evaluation conducted of the city wall at City Walls Road and at 37 and 49–55 Friar Street revealed that the medieval wall had probably undergone repair during the Civil War (Miller 1999, 3).

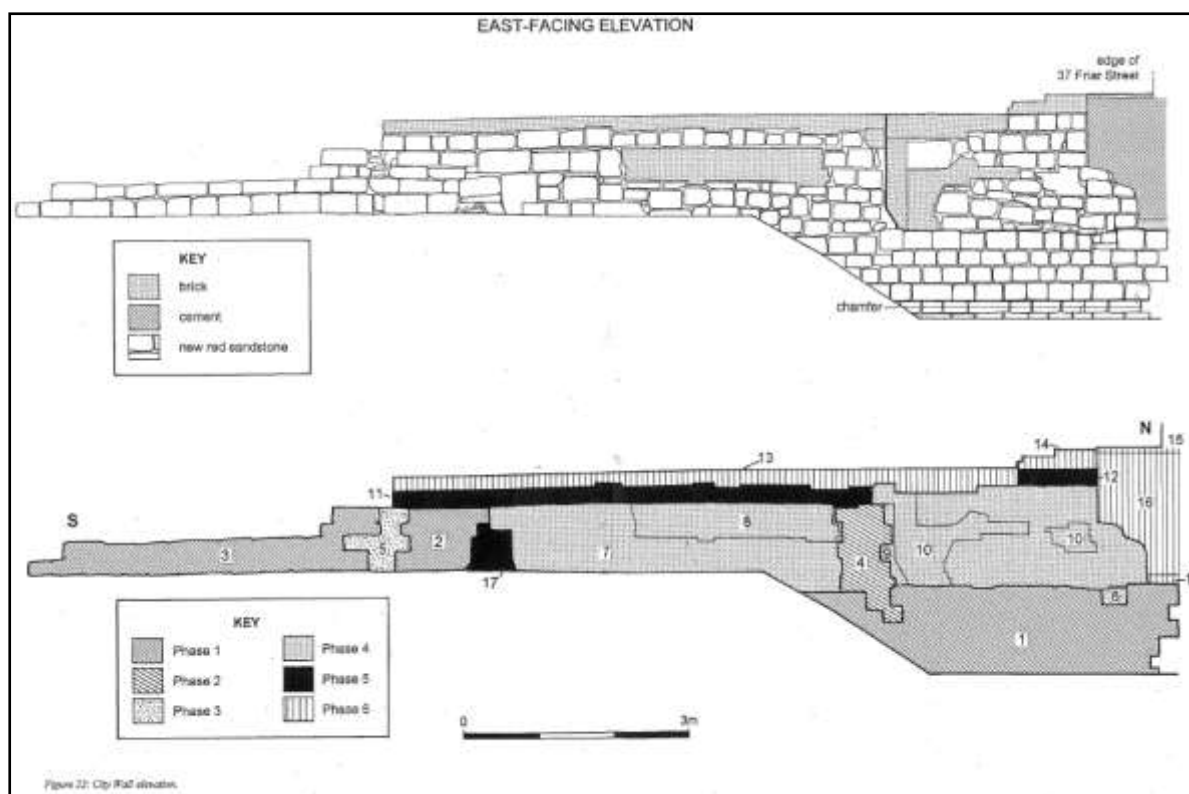
#### **7.6.12 Sidbury**

The area known as 'Sidbury' and the city wall, both Scheduled Monuments, were the subjects of archaeological works between 1997 and 2000. Trenches 1, 2, 5, 11 and 14 focused on post-

medieval deposits. The eastern section of the site had undergone significant levelling and redevelopment, evidencing extensive quarrying for iron ore or an attempt to reinforce the defences of the city during the conflict (Jackson *et al.* 2001, 1, 3, 6, 7, 12).

In Area 1, Contexts (102), (104), (105), (111), (116), (1156) and (1157) revealed substantial deposits of soil up to 50cm thick. Along with evidence of charcoal, bricks, mortar and tile fragments, the data is indicative of digging pits (Jackson *et al.* 2001, 24). Evidence of the (presumed) importation of soil may suggest the preparation of defences in the area, with later landscaping (further soil importation) to restore and redesign the landscape after the defences were no longer required or their maintenance had been neglected; the presence of bricks, charcoal and mortar may be indicative of destroying buildings to make way for the defensive structures.

Area 2 focused on the city wall and the immediate vicinity. It revealed that in *c.* 1646, the wall was badly repaired, with sandstone placed into the ashlar blocks that compromised the medieval wall. A second phase occurred in 1651–1652, when 5cm thick handmade bricks and sandstone were used; with no evidence of coursing, it has been interpreted as poor-quality work. This information has been tied into the historical record on the demolition of the wall when Parliament ordered its destruction in June 1651 and the poor rebuild being conducted by Scottish troops working for Charles II in late 1651. In 1652, Cromwell ordered the destruction of the wall and its maximum height to be reduced to 1.5m (Jackson *et al.* 2001, 26–28). **Figure 131** illustrates Phases 1 and 2, which represent work during the Civil War period, with Phases 5 and 6 representing the *c.* 1646 work and Phases 7, 8, 9 and 10 illustrating the *c.* 1651–1652 work.



**Figure 131: Phases 1 and 2 represent the Civil War destruction and rapid repair of the city wall (Jackson *et al.* 2001, Figure 22)**

Deposits located adjacent to the city wall revealed evidence of attempts to repair the medieval city wall. In addition, attempts to reinforce it, by constructing earthen banks within a system of earthworks to defend Sidbury and Fort Royal, were also discovered. The evidence for this was a clay loam of dumped soil in Context (1244), which was in part formed by the creation of 13 postholes. Three postholes (Contexts (1251), (1253) and (1255)) contained sandstone and building material, with others having been truncated. One deep square posthole was discovered containing roof tiles and brick fragments. A linear north–south cut (Context (308)) was parallel to the city wall and was overlain with a series of layers over a metre thick. In total, 13 sherds were discovered, five of which dated to the medieval period, along with pieces of post-medieval buffware, stoneware and red sandy ware and other material (Jackson *et al.* 2001, 28, 32–33, 43–44).

The evidence of clay dumps suggests that basic defensive preparation was being undertaken. Evidence of postholes may be indicative of the placing of storm poles to slow down an assault. The discovery of roof tiles and bricks suggests that certain areas were destroyed, perhaps in an attempt to create a field of fire. Whatever the reason, this is further evidence to illustrate the impact that the Civil War had on the landscape of Worcester.

Excavations in 1973 at 16/20 City Walls Road near the corner of South Street revealed evidence of putlogs for the suspension of a frame over the ditch (**Figure 132**). This has been interpreted as an intersection of the Civil War defences in the city walls, a redoubt covering Friar's Gate or a tower. However, the suggestion of a redoubt is less likely (Bennett 1980, 70, 77, 79).

Evidence of a frame suggests the possibility that the defenders were concerned about this feature. As the feature was near Friar's Gate, the putlogs could be seen as an attempt to reinforce the surrounding area. It is possible that a frame over the city ditch could have assisted with the movement of troops in the vicinity. Because of its proximity to Friar's Gate, the evidence illustrates that the cityscape of Worcester did influence the placement of defensive features.

#### **7.6.13 The Bastion South of St Martin's Gate**

Beardsmore (1980, 63) recorded that an undocumented bastion survived at St Martin's Gate. Excavations between 1976 and 1979 revealed evidence of a bastion at the rear of Holtham, 4/5 Cornmarket. No further details are given by Bennett (1980, 85); therefore, it cannot be confirmed whether this was a Civil War feature.

However, an excavation in 2003 of a 5m by 1.6m trench immediately behind St Martin's Gate Bastion revealed evidence that Civil War reinforcement was conducted. It contained evidence of sandstone rubble bonded together in a loose lime mortar, in addition to brick, indicative of 17<sup>th</sup>-century work (Napthan 2003a, 4.2, 6.7.1). This evidence suggests repair of the bastion during the Civil War.



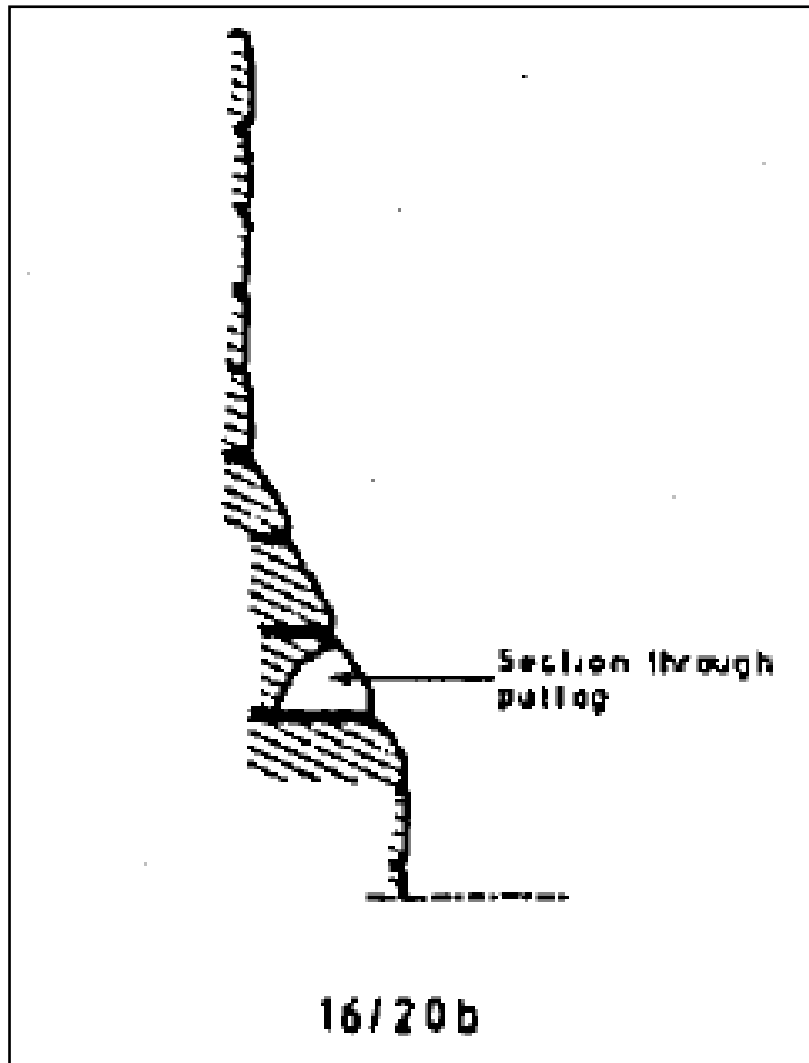


Figure 132: Archaeological evidence of a putlog, perhaps indicating Civil War refurbishment of the area (Extract of Bennett 1980, Figure 19, page 72)

#### 7.6.14 The Blockhouse, Friar's Gate

Excavations of Friar's Gate at Union Street in 1976 revealed three walls of poor creation. This evidence, combined with documentary research, may indicate that the gate was rebuilt in 1643 (Beardsmore 1980, 62; Wills 1980, 107, 109). The three walls might have been medieval in date and could suggest the re-use and repair of earlier structures and the fact that the defenders were utilising the existing landscape to the best of their ability.

#### 7.6.15 The Civil War Bank

Excavations at 39–55 Friar Street revealed that Context (2003) was a thick (c. 1.1m) compact deposit of reddish-brown marl containing flecks of charcoal and brick fragments. This has been

interpreted as evidence of refortifying the medieval wall with the addition of earthen banks during the Civil War (Jackson *et al.* 2001, 35, 37).

#### 7.6.16 Other Evidence

A charcoal drawing (**Figure 133**) (Edmund Simons, pers. comm., 2016, 6<sup>th</sup> January) was discovered in Worcester Cathedral by the cathedral archaeologist, Chris Guy. According to him, the image is “on a buttress in the south wall of the roof-space above the north aisle of the quire, which is now accessed via the triforium wall-passage. It appears to...represent a view of Fort Royal and may date from just before the Battle of Worcester on 3<sup>rd</sup> September 1651” (Chris Guy, pers. comm., 2016, 8<sup>th</sup> January).

The engraving shows two images of Fort Royal. The angle flanks are more obtuse than suggested by the fortification manual of Norwood (1639, 18) (**Figure 9**). If this is an accurate representation of the fort, then the physical feature constructed differs from the manuals of the period.



**Figure 133: Charcoal engraving of Fort Royal (photograph by Christopher Guy, reproduced with permission of the dean and chapter of Worcester Cathedral)**

## 7.7 GIS Analysis of Worcester

### 7.7.1 Worcester Cartographic GIS Regression Analysis

Having examined the series of cartographic sources available in section 7.5, further analysis is undertaken using the ArcGIS 10.5.1 programme to test the accuracy of the plans and thereby the earlier findings.

The plan of Worcester titled *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (Reference: 899.41) was geo-referenced using six control points under the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr) (**Figure 134**).

Attempting to geo-reference Doharty's (1741) map of Worcester proved difficult. After five control points, the image was too stretch to continue geo-referencing.

The attempt to plot the Anonymous *c1650, Plan de Worcester* was unsuccessful. After three control points the image became warped and further geo-referencing would have degraded the image further.

Roper and Young's (1808) plan of the city of Worcester was geo-referenced relatively easy using only five control points using the transformation 1<sup>st</sup>-Order Polynomial (Affine) and saved as a layer (.lyr) (**Figure 135**). The geo-referenced plan demonstrates an accurate representation of the city and the position of the fortifications and artillery conformed to the known positions.

Whilst a general plan, containing no scale and a significant portion of artistic licence given the nature of the drawing, Ross's (1887) was able to be approximately geo-referenced into the modern cartographic landscape, using only six control points, the transformation 1<sup>st</sup>-Order Polynomial (Affine) and being saved as a layer (.lyr) (**Figure 136**).

### 7.7.2 Analysis of Cartographic Regression Methodology for Worcester

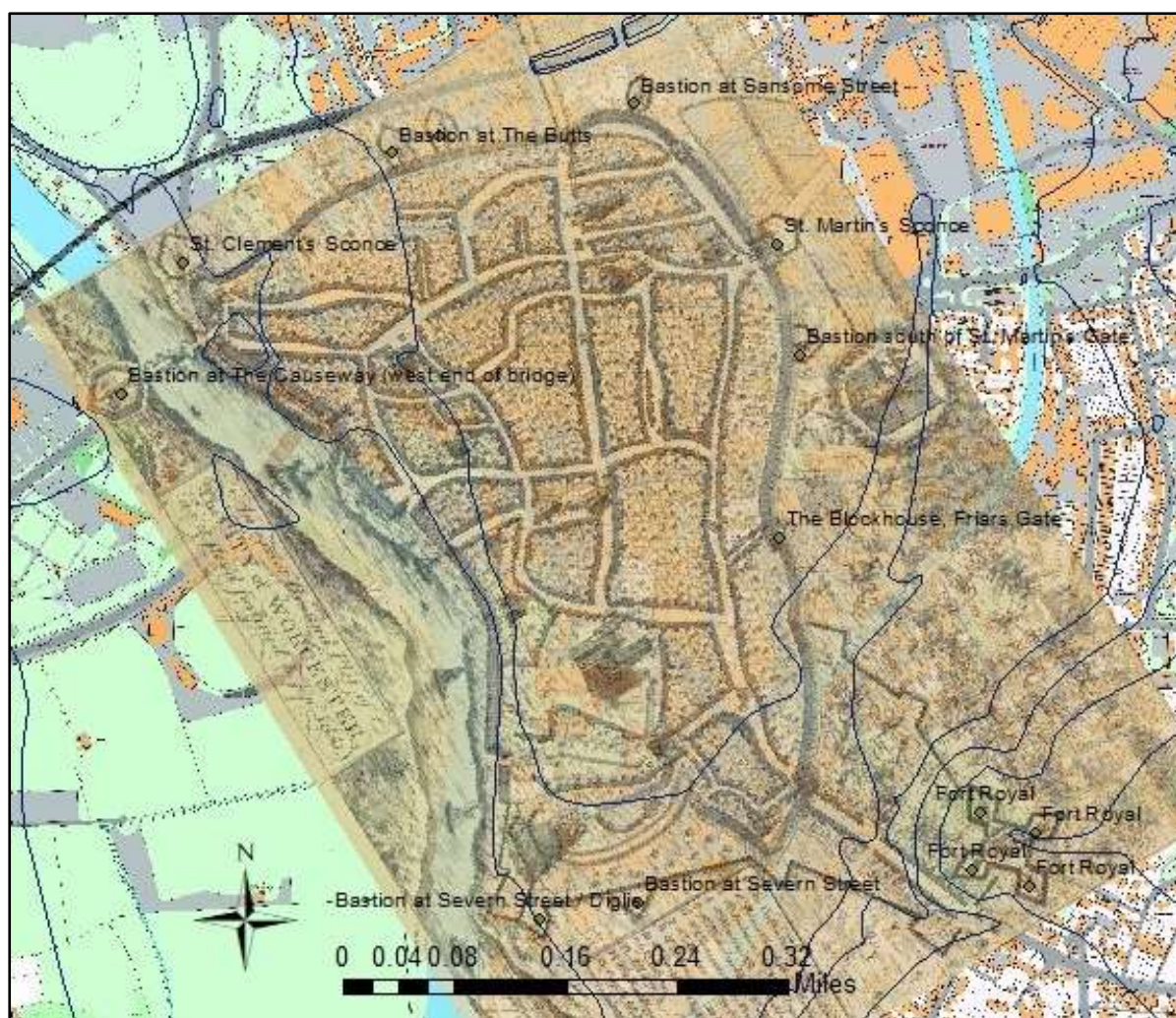
When analysing the general plan *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (Reference: 899.41), whilst it was successful geo-referenced it is also important to focus on the artistic license of the source. However, the image, when using the transparency feature to assist geo-referencing, does provide generalised details of where specific fortifications were sited.

The methodology was unsuccessful in geo-referencing Doharty's (1741) map and the Anonymous *c1650, Plan de Worcester*. It is unfortunate regarding Doharty's plan as source appeared to reveal survival of several spurs and bastion system nearly 90 years after the conflict concluded. The unsuccessful referencing of the *Plan de Worcester* is disappointing as it focused on the city walls.

The most successful geo-referencing was conducted on Roper and Young's (1808) map of the city demonstrating the importance of this early 19<sup>th</sup>-century source to analysing the positions of the fortifications constructed during the Civil War. With the aid of the transparency mode, the map was particularly effective in relation to the southern section of the defences.

Whilst Ross's (1887) plan was successfully geo-referenced and it does provide the key positions of the fortifications (most likely taken from the numerous copies available of *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651*), and given the artistic license of the source, it does provide a basis for examining the positions of the fortifications in further detail.

The overall conclusion of the use of the geo-referencing methodology was intermittent for Worcester. Whilst the generalised plans provide a suitable basis for further analysis and highlights the importance of Roper and Young's (1808) map as a source, it was unsuccessful in geo-referencing Doharty's (1741) map and the Anonymous c1650, *Plan de Worcester* which could have yielded further information.



**Figure 134: An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: (Ref 899.41) geo-referenced into the modern landscape illustrating contours with 25% transparency (generated in ArcGIS 10.5.1) (scale 1:9,000)**





Figure 135: Roper and Young's (1808) geo-referenced into the modern landscape with 25% transparency (generated in ArcGIS 10.5.1) (scale 1,9000)



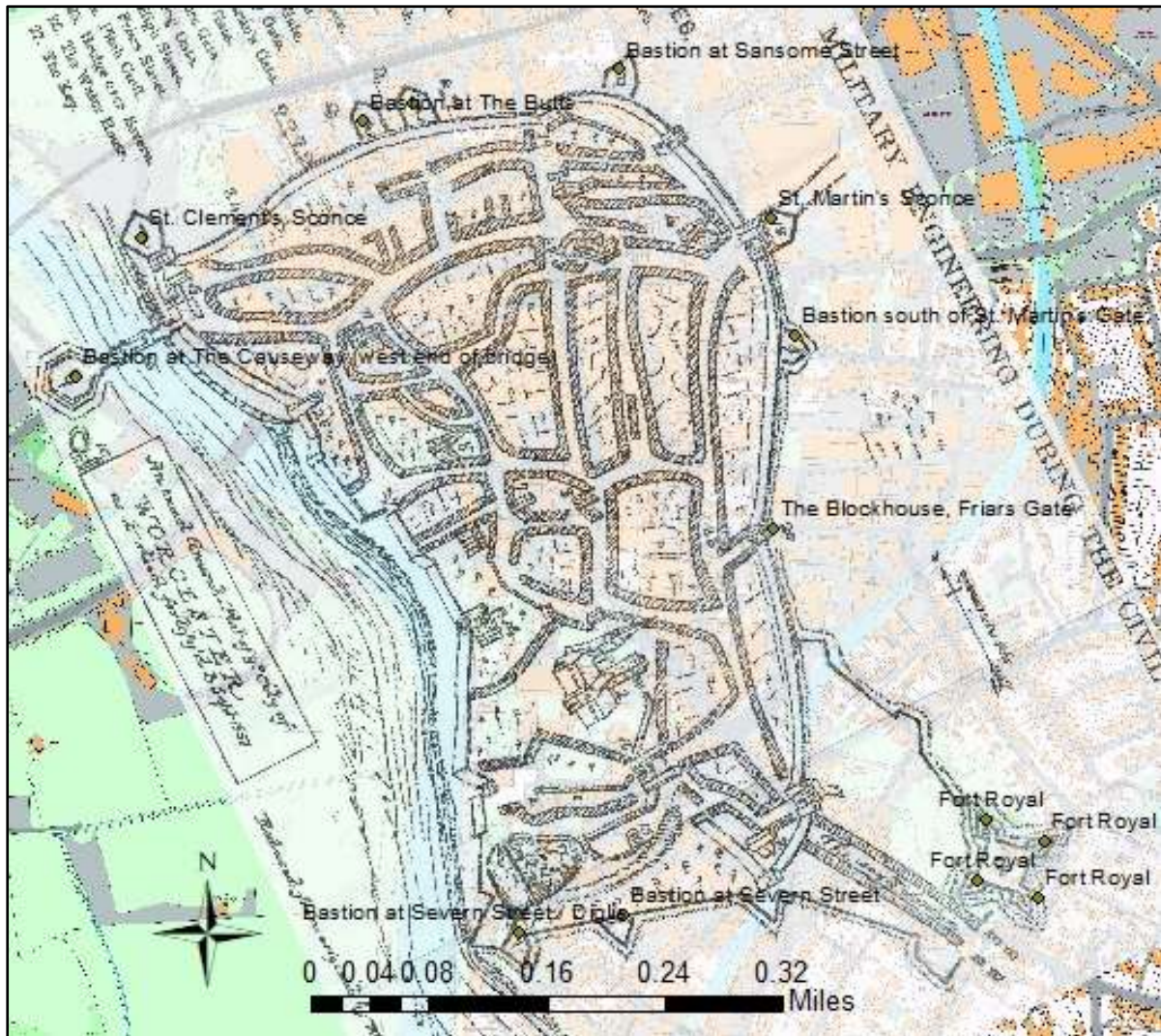


Figure 136: Ross's (1887) plan geo-referenced into the modern landscape with 25% transparency (generated in ArcGIS 10.5.1) (scale 1:9,000)

### 7.7.3 New Worcester Cartographic Sources

Based on the above analysis, including noting Paton and Cook (2016), referred to in section 2.2.6 Site Analysis, and regarding settings discussed at section 2.2.7.2 GIS Settings, including the work of Partida (2011, 1-4), using *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (Reference: 899.41), Roper and Young's (1808) plan, Ross's (1887), Atkin's (2004, 124) for reference and the modern 1:10,000 Raster were utilised for drawing the fortifications, road network and River Sever (**Figure 137**). The graphics were converted to a feature and saved as a shape file.

Geological and contour data were added onto the 1:10,000 Raster, with positions of the artillery (and fortifications), including road network and rivers also overlain. The bedrock geological data symbology was modified under the value of BGSRef. An attempt was made to increase the classification, however of the four datasets one was not able to go above a

classification of one. It was therefore decided to use the same variable for all four datasets. This is disappointing, but a limitation of the datasets available. The label field was modified to RCS\_D to illuminate the bedrock the fortifications were constructed on. The labels for the contour data was modified to Prop\_Value, thereby illustrating the aOD of the modern landscape in metres.

The OS Terrain DTM data, contour data the positions of the fortifications, the road networks and River Severn were placed into ArcScene 10.5.1 (**Figure 138**). The use of this programme demonstrated the topography of the city in 3D.

#### **7.7.3.1 Analysis of New Worcester Cartographic Sources**

The new plan denotes, like Bristol and Gloucester, the importance of the topography when selecting positions for fortifications. The 20m contour line runs through the western half and south-east of the city, passing close to the bastion at The Butts in the north and south to The Blockhouse at Friars Gate. The topography also denotes why the position of Fort Royal was vital to the defence of the city. The series of high positions outside of the city, for example, to the north of the bastion at Sansome Street to and the including the bastion south of St Martin's Gate explain why the fortifications were constructed there. The topography also explains why two bastions were constructed so close together, namely the bastion at The Butts and the bastion at The Butts / Farrier Street; in order counteract any potential enemy artillery positions using that ground. The uniform geology of siltstone meant that any fortification would have been constructed on the same material (**Figure 137**).

The 3D depiction of the landscape and the fortifications constructed on them emphasises the high ground to the south-east, namely the position of Fort Royal, along with the high ground to the north. The image also emphasises the importance of the River Severn to the city (**Figure 138**).

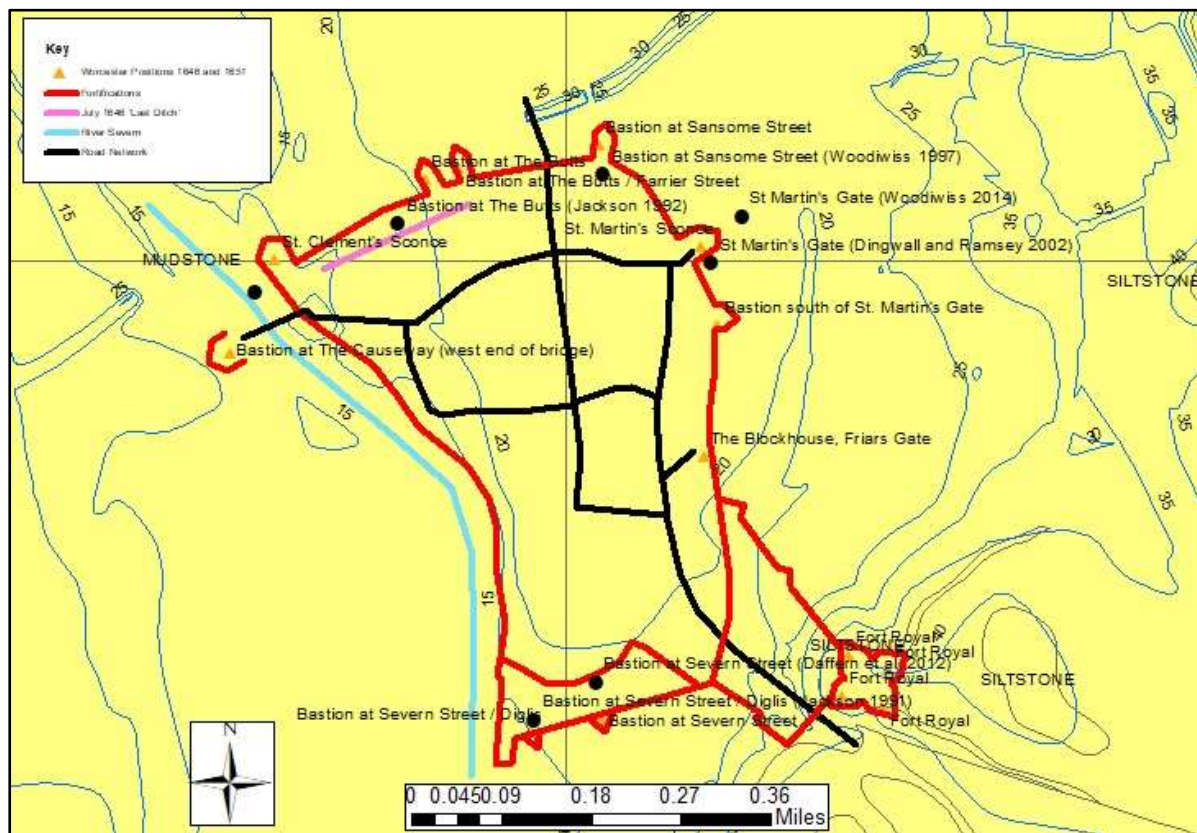






Figure 138: A 3D view of the defences of Worcester (generated in ArcScene 10.5.1) (no scale)

#### 7.7.4 GIS ‘Fields of Fire’ Analysis of Worcester

##### 7.7.4.1 1646 and 1651

Analysis of the overall viewsheds (**Figure 139**) shows generally good coverage of the artillery throughout the city. The analysis, like Gloucester, is theoretical in nature of the artillery (see section 2.2.7.3 GIS Issues) and the positions the pieces occupy. General good coverage is seen throughout the northern sector of the defences, until St Martin’s Gate and the east section of the defences passed The Blockhouse at Friars Gate. The topography indicates why fortifications, later Fort Royal was constructed on the hill, with a potential issue immediately south of the fortification. General good coverage of the artillery and musketry is to the bastion at Severn Street, with a small gap in the ability of the artillery to the east of the bastion at Severn Street.

Like Bristol and Gloucester, the focused theoretical viewsheds of the northern sector (**Figure 140**) demonstrates that the artillery could not fire on (in this case) the River Severn, however, as previously discussed this is a methodological issue. The reason for positioning a bastion at The Causeway is evidently an attempt to stop enemy troops from crossing the River Severn at the bridge and entering the north-west of the city. Whilst the viewsheds indicate good coverage overall, there is intermittently sections to the south of the position that enemy troops

could navigate to avoid an artillery bombardment. The St Clement's Sconce was positioned to monitor any approach from the north-west and itself has problems immediately to the north where artillery could not fire. This could have been a strategic error, although moving / discounting the fortification would not benefit the besieged.

The two closest fortifications, The Butts Bastion and the bastion at The Butts / Farrier Street (**Figure 140**), from flank to flank were only 31.5m apart, and viewshed analysis of the range of the artillery demonstrates a gap directly due north of the fortifications' positions, suggesting a concern in both 1646 and 1651 of an attack from the north. However, this gap was well within the range of the musketry of the period. Such a short distance appears contrary to the effectiveness of the bastion, having noted that the distance between features should be 250 yards (228.6 m) (Atkin 1993, 152). Perhaps this is evidence of a symbolic hold of the landscape, to take the high ground whilst compromising on the effectiveness of the fortifications. The archaeological evidence adds to this interpretation, demonstrating a significant ditch (Jackson 1992), with the truncation and re-use of the medieval wall explaining the reasoning behind attempts to secure those positions.

What is also surprising is the construction of the bastion at The Butts immediately to east of higher ground, namely the 20m contour (**Figure 140**). Using this position would have made use of all the available higher ground and avoided the need for two bastions to be positioned closer together, thereby inviting enemy gunners to be less precise in firing on this sector of the defences and still hitting a target; as there is an area of ground to the north of these fortifications that cannot be hit by the artillery due to their positions and the topography. This appears to be a strategic and tactical error on the part of the defenders when constructing the fortifications, as the viewshed analysis indicates that it can be theorised that having only one bastion in this region would have been just as effective as two.

The range of the artillery at the next bastion at Sansome Street was interjected, arguably a result of the local topography (**Figure 140**). The ridge of high ground to the north of the fortification as indicated by the 30m contour line, emphasises that only the demi-culverin artillery could have effectively attacked any battery positioned by the enemy on that land.

Continuing farther, the construction of a sconce at St Martin's Gate continues to emphasise the importance of controlling the road network in and out of the city (**Figure 140**). Another ridge of high ground appears to the east of this position, again representing a tactical problem, although strategically constructing a fortification at the Gate was correct. The bastion south of St Martin's Gate suffers from the same problem as the bastion at the Gate. The reason for constructing the fortification there could have been an attempt to reinforce the position by

the besieged, as St Martin's Gate was surely to be known to be a strategic and tactical weakness. It is also important to note that following the protection of the south bastion by musketry, the defensive line, which had artillery protection for most of the northern sector, was now vulnerable to assault.

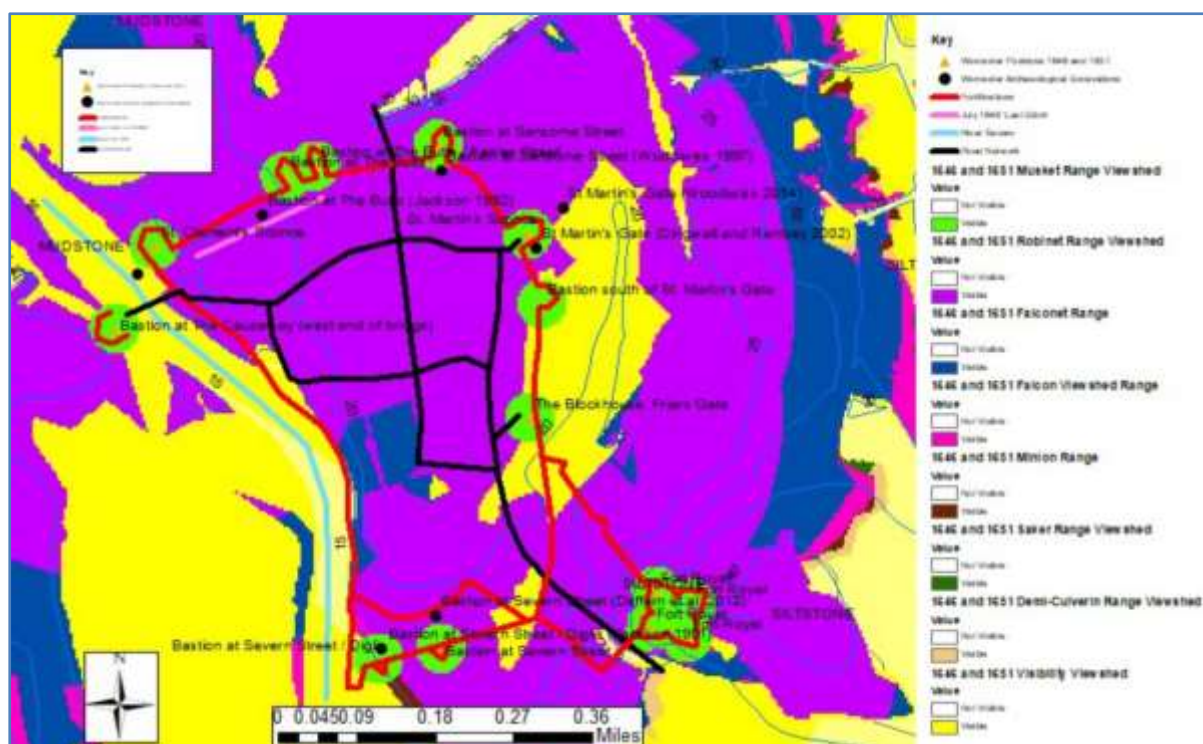
Examining the southern section of the defences (**Figure 141**), the defensive line remains unprotected by artillery coverage, but still visible to any approach to The Blockhouse / Friar's Gate, where the only protection appears to be the musketry. The lack of artillery coverage is due to the continued change in the topography of the landscape to the east of the position.

The defensive line, noted on Roper and Young's (1808) cartographic plan, remains exposed until it reaches the 20m contour line as section diverges heading south-east towards Fort Royal hill and the fortification(s) built upon it. The viewsheds demonstrate the importance of the high ground, with a small gap in the defensive coverage of the artillery to south-east of the fortification, in addition to the south, where the fort should be covering the London Road network in and out of the city at this position (**Figure 141**), however, there is irregular coverage of the roynet, falconet and demi-culverin artillery pieces along this section.

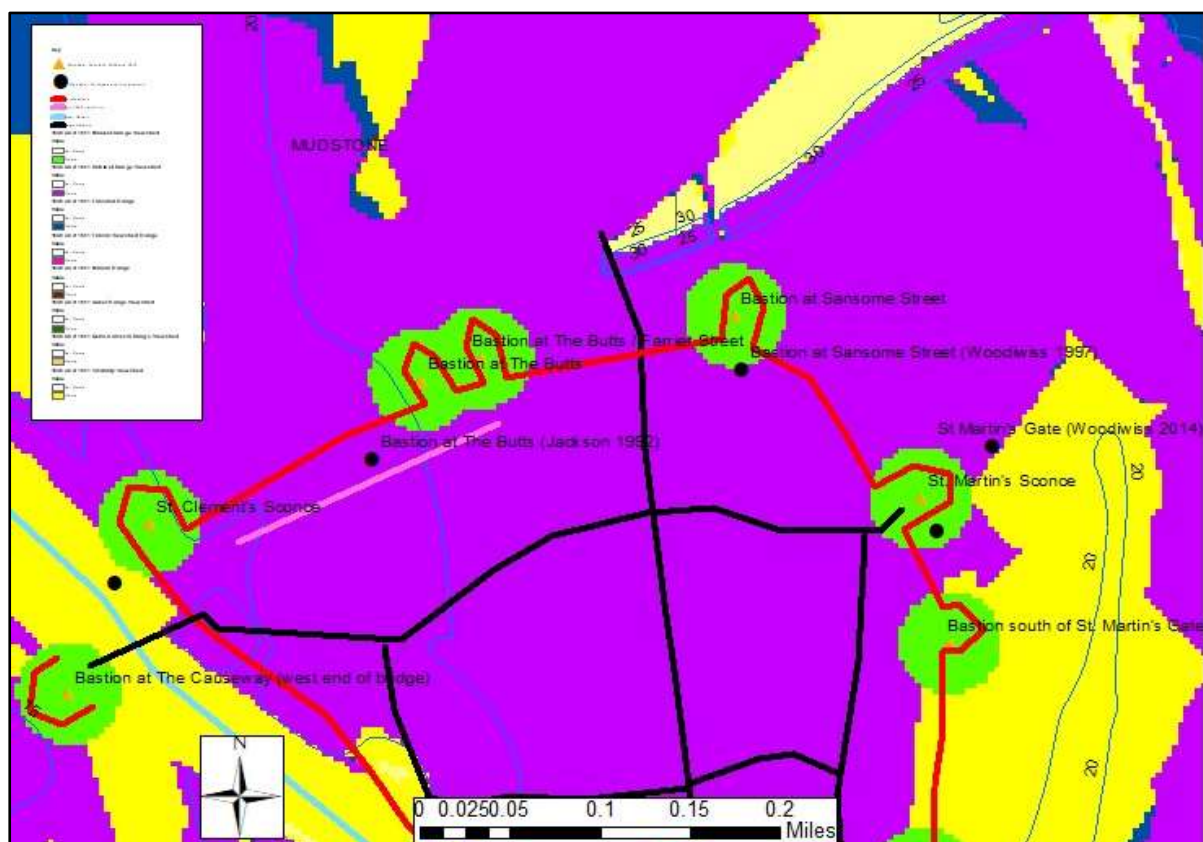
Returning to the convergence point of the fortifications, some sections of the defensive line remain uncovered by artillery protection (**Figure 141**), to and including the entrenchment at Severn Street. The final series of fortifications, including Severn Street Bastion, Severn Street / Diglis Bastion (which sits on the 15m contour) and new works near Worcester Castle, provide viewsheds illustrating an attempt to control the southern approach towards the city, with the new works near Worcester Castle demonstrating the importance of the position in the landscape. This evidence connects with the archaeological research at 42 Severn Street (Daffern *et al.* 2012) explaining why the medieval ditch was recut. This also explains the importance of cutting a U or V-shaped ditch and the destruction of medieval structures in the vicinity to create an effective position. The importance of this position is emphasised when examining the results of the excavations by Barker (1968/1969) and Jackson (1991) regarding the creation of a significant feature containing storm poles and a fire step to further secure the position.

The defensive line on the west side of the city, next to the River Severn, retains some protection of the artillery (**Figure 141**), specifically, the demi-culverin, falcon and falconet pieces, until it heads further north, representing as discussed earlier a tactical weakness in the defences.





**Figure 139: General 1646 and 1651 viewsheds of Worcester (generated in ArcGIS 10.5.1) (scale 1:10,000)**



**Figure 140: The northern sector of Worcester viewsheds (generated in ArcGIS 10.5.1) (scale 1:5,500)**

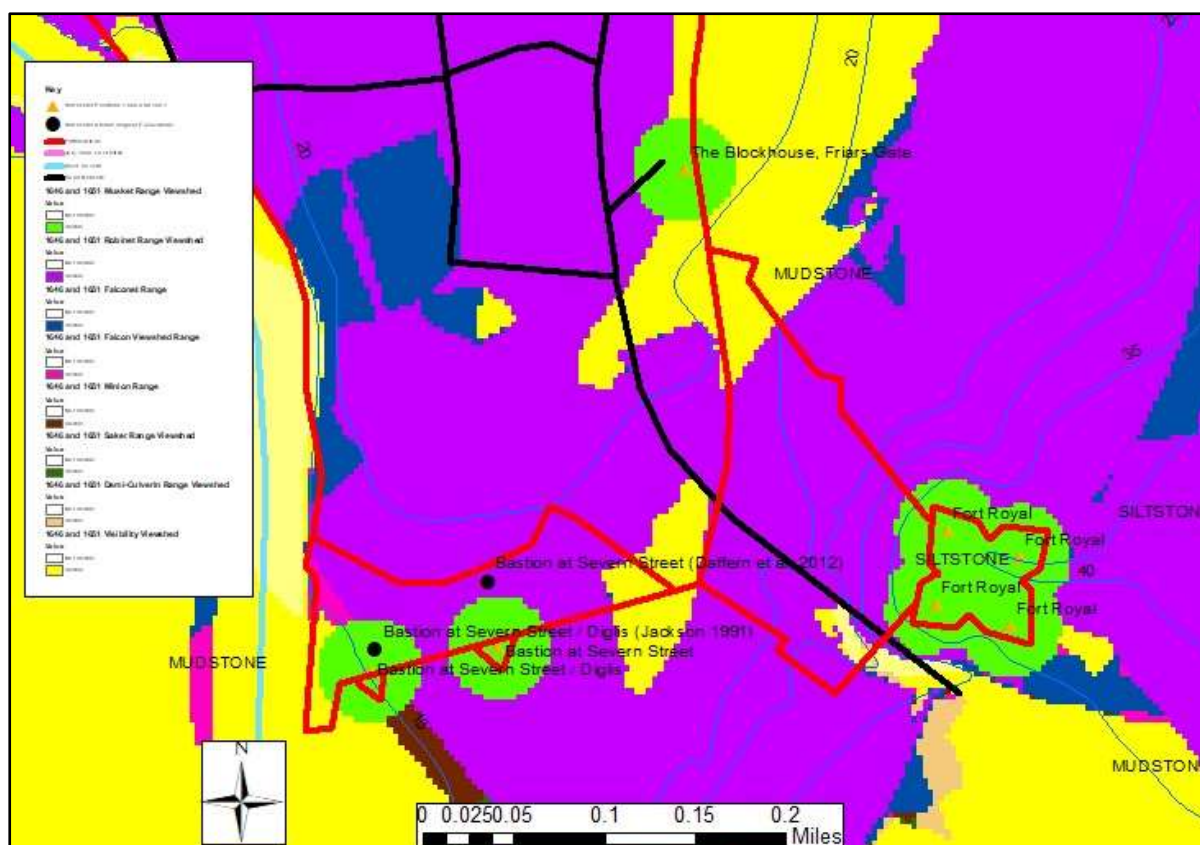


Figure 141: The southern sector of Worcester viewsheds (generated in ArcGIS 10.5.1) (scale 1:5,500)

## 7.8 Legacy of the Fortifications of Worcester

### 7.8.1 Extant Features and Analysis

The east and south bastions (as defined by Noake's 1879 plan) of Fort Royal have survived (**Figure 142**). Whilst the earthen feature has weathered and may not be at the same height as when the structure was constructed, the survival of half of the sconce fortification demonstrates what an undertaking constructing one fortification was. Like Brandon Hill (Bristol) and the earthwork at the Vineyard (Gloucester), the remains of Fort Royal are designated a Scheduled Monument.

On the surviving earthworks, the use of signage and small replica artillery adds an additional visual dimension for anyone visiting the remains of this fortification. The fact that the fortification now resides in a park tells of the contrasts in that physical space. On the one hand, the landscape holds part of a fortification that played a significant role in the overall outcome of the English Civil War: an event that has affected not only the landscape but also the social and political fabric of society. On the other hand, the modern landscape around it consists of mowed lawns, flowerbeds and play areas. This disparity in the landscape illustrates the problem that fortifications of this era have in the modern world. Without the signage and

small replica artillery, apart from the landscape itself, the site of Fort Royal struggles to establish itself in the modern environment. Therefore, in part, it is difficult for the fortification to cement its legacy in the contemporary landscape.



**Figure 142: A view from a bastion of Fort Royal containing signage and a small replica artillery piece, facing west-south-west**

Therefore, to whom does the modern landscape belong? Using signage and maintaining the landscape illustrate the priority of the visual over the other senses of smell, sound and touch (Garner 2001, 133). Whilst the positioning of replica artillery does inform the touchscape, the lack of a smellscape and soundscape does, in part, diminish the perception of the fortification. The sounds and smells of people excavating, moving earth, creating bastions and ditches, and firing artillery, with smoke limiting the view that the commanders and soldiers would have had of the action around them, are a distant memory to the modern life that inhabits the site today. If people were regularly exposed to those stimuli, it would, no doubt, affect their perception of the landscape they inhabit/encounter and promote awareness of the fortification and create/improve its current legacy.



Sections of the medieval city wall have survived into the present day. Of interest is the partial survival of the medieval St Martin's Tower (Atkin 2008, 109), near St Martin's Gate (**Figure 143**), adjacent to a section of the city wall repaired during the conflict. The significance of this feature illustrates the impact of the Civil War on the landscape of the city: in this case, the medieval city wall.

The re-use and modification of the medieval city wall would have affected how the people of Worcester would have thought about their landscape. This is because humans have concerns about things that matter to them; therefore, the modification of this landscape, especially a feature designed to contain and protect people (the city wall), would have no doubt caused concern for the people inside it. It is this importance of place that is vital to people. Places give people a sense of identity: they associate a site/feature with important events in their lives (Thomas 2001, 173).



**Figure 143:** The medieval city wall and St Martin's Tower, facing north-north-west

What the repairs and modifications to the city, including the new bastions, illustrate is the meeting of two different worlds: the old landscape (medieval defences) and the new landscape (*Trace Italienne* bastions); in this case, both worked together to protect the city from

an outsider aggressor, which happened to be people from the same stock, although with different views on how the country should be governed and whom by.

### **7.8.2 Destroyed Features and Analysis**

The cartographic evidence analysed previously, including that of Doharty (1742) and Green (1764), illustrated no surviving evidence in the landscape of a sconce over the west end of the bridge, St Clement's Sconce, the bastion at The Butts, the bastion at The Butts / Farrier Street, the bastion at Sansome Street, St Martin's Sconce, the bastion south of St Martin's Gate or The Blockhouse at Friar's Gate. This can be explained by the redevelopment of the city and the probable need to remove the features from the landscape.

Cartographic representations, including those of Doharty (1742) and Roper and Young (1808), have illustrated the survival of sections of the defences in the southern area of the city, including Fort Royal but minus specific bastions, such as the one on Severn Street.

Ultimately, the 1:10,560 First-Edition Ordnance Survey Map illustrates the lack of survival of the Civil War fortifications into the 19<sup>th</sup> century.

What this illustrates is the gradual removal of sites containing Civil War fortifications. This is because landscapes "like time, never stand still" (Bender 2002, 103). The continued evolution of a feature means that it never stays the same. The continued redevelopment and enhancement of cities after the Civil War demonstrate how they 'moved on' from the events that radically altered them. The lack of surviving fortifications is a testament to the continued "urbanisation" (Harrington 2003, 58) of the cities that once held these features.

However, the Commandery (extant during the period) now plays an important function as a museum to the Civil War, illustrating how a city commemorates its heritage and the role it played during the conflict. This is part of the legacy of the fortifications and the Civil War itself.

The city does, however, like Bristol and Gloucester, have a "profane archaeology" (Dawdy 2015, 6), whereby the underlying effect that the archaeological remains had on the city continue to affect it. For example, the bastion and ditch created at St Martin's, requiring demolition and refilling only a few years later, survive like an imprint underneath the modern landscape. Indeed, the bastion and the ditch are dialectical artefacts of the landscape. One probable reason for the destruction of the fortifications is that they did not "fit in" with earlier medieval features and the redevelopment of the area (Dawdy 2015, 9). But why should they? In order to effectively site these features in the landscape, to create a field of fire, the destruction of long-standing buildings and suburbs was required. People saw their homes torn down to

make way for the ‘empty’ and desolate fields of fire, whilst others would have seen a bastion and ditch system in place of their homes.

## **7.9 Summary**

The evidence has illustrated how the landscape and cityscape of Worcester influenced the placement of fortifications. One of the most interesting aspects is the closeness of the bastion at The Butts and the bastion at The Butts / Farrier Street. As the GIS viewshed analysis suggests it must have been a strategic and tactical weakness to place two fortifications in such proximity; however, it appears to suggest that the defenders were concerned with an attack from the north and decided to illustrate a ‘show of strength’. In addition, these fortifications might have been demonstrating command of the high ground – perhaps the perception of holding the high ground was considered more important than other strategic or tactical considerations, with the obvious other example being Fort Royal.

The archaeological evidence demonstrates that the landscape and cityscape had little impact on the design of the fortifications. Evidence discovered at the location of the bastion at Severn Street / Diglis indicated that the fortifications did conform to the manuals of the period, including more-complex aspects, with indications of an outer glacis bank, storm poles and a fire step. Indeed, it is highly likely that whoever was directing the construction of the fortifications had some understanding of modern theories and practices and possibly consulted the existing military manuals directly.

The surviving elements of the medieval and post-medieval worlds combine significantly. The partial survival of St Martin’s Tower, next to the sections of the medieval city wall repaired and modified during the Civil War, demonstrates significant changes to the landscape.

Overall, the construction of the fortifications and the destruction of the suburbs altered the landscape of Worcester and had a profound impact on it. The evidence has demonstrated that the destruction of the suburbs was necessary to create a field of fire. However, the re-use of the medieval ditch and the influence of the city wall have demonstrated the importance of the existing landscape.



## **Chapter Eight: Discussion**

### **8.1 Introduction**

The purpose of this chapter is to discuss the findings of the previous chapters and to present the results in the wider context for discussion.

### **8.2 Comparison of the Archaeological Evidence**

The archaeological evidence for all three cities demonstrates that significant amounts of resources, supplies and administration went into planning, constructing and repairing/enhancing old works and creating new fortifications. The evidence demonstrates the creation of significant ditches in the landscapes to create defensive barriers. This demonstrates that commanders, engineers and tacticians understood the need to create new defences, whilst repairing existing dilapidated features, in an attempt to combat an assault from artillery, having regard to the wars on the continent and the effects thereof, with long, complex and difficult sieges seen in Rouen at the end of the 16<sup>th</sup> century and in Ostend at the beginning of the 17<sup>th</sup> century (Porter 2011, 2).

Complex fortifications are seen in Bristol and Worcester, with evidence of a scarp at the Royal Fort, Bristol, along with evidence at Severn Street / Diglis in Worcester of an outer glacis bank, storm poles and a firing step. This establishes that, where possible, the construction of more-complex fortifications did occur. It demonstrates an understanding of modern techniques to defend against artillery and storming by infantry and cavalry. The creation of a glacis suggests a continental influence in the design, as demonstrated in **Figure 12**.

Evidence from Portwall in Bristol revealed placements of a gun battery and artillery emplacement, whilst similar data was discovered in excavations in Gloucester on Southgate Street. This demonstrates the utilisation of the existing landscape whilst at the same time creating a new landscape by generating new defensive positions.

The impact of the sieges was demonstrated significantly more in Gloucester and Worcester than in Bristol. Evidence from a series of excavations on Southgate Street, Gloucester, revealed the results of significant destruction in the stratigraphy. Similar evidence was revealed in excavations on Foregate Street, Worcester, which revealed no data pre-dating the 17<sup>th</sup> century, along with the destruction of property to make way for St Martin's Sconce. The impact of the creation and installation of the fortifications is clearly demonstrated in the archaeological record. The destruction of property and the earlier medieval and early post-medieval landscape shows the significant impact that the fortifications had.

Excavations in Gloucester revealed evidence of deliberate flooding of the landscape to create another defensive barrier; by contrast, Worcester dammed rivers to suit the besieged people's needs. Whilst this demonstrates opposing usages of the landscape, it shows an understanding of how to use the existing landscape for strategic and tactical purposes and how the landscape impacted on what defences were constructed and where. Duffy (1979, 99) notes that wet ditches were a significant feature of fortification construction in the Netherlands, which is noted in **Figure 4**.

The evidence examined clearly demonstrates that the landscape influenced the design and placement of the fortifications. For Bristol, the archaeological evidence of the Royal Fort showed the requirement to cut 1.8m into the natural geology in one section whilst constructing a bastion of 12m in length with a flank of 5 m. Evidence in Gloucester revealed the re-use of a Roman site, demonstrating the impact of the existing landscape on the construction of fortifications. The recutting of ditches in Worcester emphasises the importance of the existing landscape on the placement and design of the fortifications and what commanders and tacticians felt were necessary positions to reinforce. It is because of this evidence that the assertion by Louth (2016, 72) that the fortifications of Worcester were constructed by two different engineers is suggested to be incorrect. This is because the fortifications followed the landscape: it was the landscape that dictated where the features were to be sighted, with the engineers attempting to do their best with what resources, time and experience they had.

The excavations in Gloucester on Southgate Street led to precise dating in conjunction with the historical evidence: the archaeology illuminated the historical account, illustrating the events of 10<sup>th</sup> August 1643, with the burning of the suburbs. It is difficult to determine many other archaeological features and discoveries throughout historical archaeology that could be dated to such a degree.

Other excavations on Southgate Street revealed only part of the destructive impact that the construction of the fortifications had on the landscape of Gloucester as a whole. The Royalist sap (**Figure 87**) approaching Gloucester shows similarities with conflicts in Europe, with evidence of this seen at the Siege of Haarlem in 1572–1573; although Gloucester did not experience a 30-week siege, continental influence was prevalent – a fact not in dispute (Duffy 1979, 95; Porter 2011, 2).

In relation to the military manuals of the period, the archaeological evidence of the Royal Fort demonstrates that whilst the angle of the flanks appeared to corroborate the desired designs, the dimensions of the fortification constructed did differ significantly. Evidence discovered in Worcester at the location of the bastion at Severn Street / Diglis revealed that the

fortifications did conform to the literature of the period, including more-complex aspects, with indications of an outer glacis bank, storm poles and a fire step (**Figure 12**). This illustrates, in this area at least, that the landscape did not completely influence the design of the fortifications, as complex fortifications were able to be constructed. In turn, this evidence continues to demonstrate the impact that the fortifications had on the landscape and cityscape of Worcester. This is demonstrated by archaeological evidence recorded from excavations at The Butts. The evidence of Gloucester is also conflicting, with some sites conforming to the military manuals (the North Gate), whilst other sites (the East Gate and St Michael's Square) did not. The culmination of all the evidence suggests that whilst there were attempts to follow the desired standards of the period, it was not always possible to do so. This is, however, the reality of war: rigid, standard, 'clean', mathematical precision cannot always be adhered to.

Whilst the archaeological evidence indicates the specific dimensions of the fortifications, it is not ultimately possible to infer that the commanders and tacticians constructing the features would have directed the construction by reading from one of the military manuals of the period. However, the evidence does show that the general principles of the military manuals were followed. The topography and geology of where the fortifications were constructed impacted on the attempts to fundamentally secure the positions and therefore the construction. Analysing the archaeological evidence from these three cities has demonstrated how complex the archaeological record for the English Civil War is. Whilst specific dates can be ascribed to certain historical events, the record largely exists of dimensions of ditches, with little other artefactual evidence available. Ultimately, the continued urbanisation of the cities after the war means that what survives in the archaeological record is intermixed with later developments.

### **8.3 Comparison of the Topographic and Cartographic Evidence**

The topographies of Bristol, Gloucester and Worcester were all different. The placement of the fortifications was dictated by the surrounding landscape; hence, in Bristol, engineers and planners utilised the surrounding hills by constructing sites at 79m, 76m and 45m aOD, for example. In Gloucester, the landscape is much more level and at a lower height; the positioning of some fortifications at 15m, 14m and 12m aOD demonstrates an attempt to control what little high ground existed. Evidence for this is seen in Worcester as well, with the positioning of fortifications at 21m, 20m and 18m aOD, in addition to constructing Fort Royal away from the main city walls on a hill at 38m aOD. This clearly demonstrates the importance of the high ground when the selection of sites was undertaken.

All cartographic sources illustrating the whole cities of Bristol, Gloucester and Worcester demonstrate the cramped, compact nature of the early post-medieval landscape. They signify an age where castles were decaying or destroyed and city walls had seen better days. The sources demonstrate the importance of the River Avon (and the River Frome) and the River Severn as part of the reason why these cities had started to flourish in the medieval era.

The recently discovered Plan D12862 of Gloucester and the versions of *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651*, completed relatively recently after the end of the war (Blount 1662), are important sources. This evidence demonstrates that where there was little high ground, more of an attempt was made to utilise the existing landscape and cityscape to defend the main city. This explains why the suburbs of Gloucester (creating a shorter defensive line) and Worcester were destroyed, whereas very little was damaged in Bristol.

The expansion and redevelopment of all three cities after the Civil War and their continuing development explain why very few, if any, of the features survived to the time of the 1:10,560 First-Edition Ordnance Survey Map. The re-urbanisation of cities, particularly demonstrated by Doharty's 1741 plan of Worcester and Millerd's 1671 map of Bristol, shows how quickly the landscape changes and develops over time.

The analysis of the accounts of the defences of Bristol, Gloucester and Worcester has demonstrated significant attempts to create a successful defensive perimeter and considerable fortifications. The 1643 and 1645 accounts of Bristol by the engineer Bernard de Gomme illustrate an important understanding of the landscape and provide contrary data regarding the specified height of the ramparts, illustrating the variability of the period literature. It also demonstrates the meticulous detail of how to prepare a city's defences, with comments regarding the cutting of hedges. Corbet's description of the defences of Gloucester shows attempts to use natural features to the defenders' advantage by flooding ditches. Moreover, Dorney notes that everyone, including maids, was employed in locating turf to enhance the defences. However, this evidence continues to demonstrate how hurried the construction of the defences was. Finally, the chamber book of Worcester and Townshend's accounts illustrate that significant sums of money and resources were put into preparing the fortifications, including the destruction of houses, with Townshend noting that trees and hedges were removed in Worcester, illustrating different strategic and tactical decisions between that city and Bristol. The reason for this difference was because the hedges and trees of Bristol were part of a much wider perimeter to defend; it was therefore either not possible or not thought as

strategically or tactically necessary to destroy the surrounding features, despite the theoretical requirement to create a field of fire to halt or slow down the progress of attacking troops.

The analysis of the cartographic information for all three cities has demonstrated how the landscape influenced the placement and design of the fortifications. The evidence has also demonstrated, particularly in relation to Gloucester and Worcester, the significant impact that the construction of the fortifications had on the landscapes and cityscapes. The cartographic sources also highlight the ephemeral nature of Civil War archaeology, as many features had been destroyed or were in decline when Millerd mapped Bristol in 1671; when Washborn attempted in 1825 to ascertain what fortifications had been constructed in Gloucester; and when Doharty surveyed Worcester in 1741.

## **8.4 Context**

Every individual looks at the landscape in a different way. The same person can look at the same landscape hundreds of times and see different and new things each time. Their perception is based, in part, on their upbringing, culture and education.

The way in which the landscape archaeologist examines the landscape can be different to the way the historical geographer studies the landscape. For example, the historical geographer's investigation of the impact of the fortifications of Gloucester on its landscape would not involve the examination of earthworks and looking at old documents, to name a couple of techniques (Muir 1999, 1).

Ultimately, the issue of legacy regarding these fortifications is a thorny one. On the one hand, the archaeology of the early post-medieval period appears familiar to the people of this island. We have the historical record; costume television dramas; historic houses; music and plays from this period; and indeed villages, towns and cities that still retain the fabric of buildings from this period. However, we interact with the environment differently than people did 400 or even 50 years ago (West 1999, 2–3).

However, conversely, the Civil War fortifications, themselves having a brief period of construction, combined with the development of the landscapes they sat in, have a difficult legacy because their use and existence were all too brief to begin with. The fortifications disappeared almost as quickly as they were created.

At first glance, the archaeology of fortifications is a male-dominated world; for example, the engineers designing the forts were male (e.g. de Gomme), and the sieges and battles were conducted by men (e.g. Prince Rupert, Colonel Rainsborough and Colonel Massey). However, in Gloucester, maids were seen collecting turf for the defences, and the

involvement of Mrs Hazzard in Bristol illustrates a different story. This evidence demonstrates that certain aspects of the sieges and battles lay themselves open to both sexes. As Meskell (2001, 189) notes, archaeological evidence is irrevocably linked to politics and the materiality of the artefacts and features recovered in excavation and analysis. Civil War fortifications are symbols of identity and struggle, the events of which have had a long-term impact on the politics of the country. The increased role of women in society led the way for the Levellers movement during this period. By analysing the roles that both sexes played during the Civil War and the construction of the fortifications, this is a paradigm that can be utilised to create and enforce a new legacy and to increase the perception and understanding of that period in history in the modern world.

The perception of the fortifications, and indeed of the Civil War itself, can be enhanced by understanding that the conflict involved all echelons of society, including women. History records the role of women in the Parliamentary assault of Chester on 9<sup>th</sup> October 1645 and Lady Helen Neale's role at Hawarden Castle, also in 1645, providing but two examples (Barratt 2009, 78–79). As previously illustrated, the impact of the conflict was striking and horrific to the witnesses of the First Battle of Newbury, the siege warfare used at Taunton and the sacking of Bolton.

Projecting the legacy of the surviving fortifications in the contemporary landscape is essential to improving their perception and management. When walking the modern landscape and attempting to understand the reasons behind the placement and survival of the fortifications, one aspect that can be utilised is attempting to understand how the landscape is viewed by people conducting a variety of tasks. As Ingold (1993, 154–155) notes:

*“The surveyor’s job, however, is to take instrumental measurements from a considerable number of places, and to combine these data to produce a single picture which is independent of any point of observation. This picture is of the world as it could be directly apprehended only by a consciousness capable of being everywhere at once and nowhere in particular (the nearest we can get to this in practice is by taking an aerial or ‘bird’s-eye’ view)”. (Note: the word independent was italicised in the original quotation).*

He continues: *“we are all cartographers in our daily lives, and that we use our bodies as the surveyor uses his instruments, to register a sensory input from multiple points of observation, which is then processed by our intelligence into an image which we carry around with us, like a map in our heads, wherever we go”.*



Applying this to Civil War fortifications, as someone moves from site to site, each one largely in isolation from the others, means that they can be perceived as individual features in the landscape, rather than as part of a wider network of defences.

Examined separately, each feature begins life as an independent point in the landscape; however, features such as the earthworks on Brandon Hill in Bristol, Fort Royal in Worcester and the Vineyard near Gloucester demonstrate a legacy of conflict and division and are symbolic of a fractured period in British history, represented by a divisive landscape. The perception of a few surviving earthworks can register as a low priority in the consciousness of people who walk by an image that itself is testament to, in part, a forgotten conflict. Central to this is the fact that the evidence from archaeology and the analysis of surviving features is interpreted and re-interpreted because it is what survives in the landscape, as Hicks (2016, 3) notes: “Archaeological knowledge is what is left behind”.

The surviving place names have significance and illustrate the legacy of the Civil War and the fortifications (Philip Rowe, 2016, pers. comm., 30<sup>th</sup> September). One example is the site of the Royal Fort in Bristol. Before its construction, the site was known as ‘Windmill Hill’, with the fortification constructed by the Parliamentarians known as ‘Windmill Hill Fort’. After the construction of the Royal Fort, the site retained its name, with the first house being leased to Daniel Brereton in 1655, which gives an earlier date than the plan published by Millerd in 1673; the current house was constructed in *c.* 1760 (Leech 2000, 54–55) (**Figure 28**).

An important factor in any war, perhaps even more so in a civil war because the enemy could be your friend, your brother or your neighbour, is the bitterness that it causes (Nicholas Saunders, 2014, pers. comm., 22<sup>nd</sup> June). The destruction of property and industry in all three cities, particularly the suburbs in Gloucester and Worcester, to make way for fortifications, the line of sight for musketeers and artillery, and shorter defensive lines would have no doubt stirred angry and violent emotions. One wonders what Mrs Fleet and Mr Street of Worcester felt when they saw their properties destroyed to make way for the fortifications.

For the ordinary person caught up in the sieges and battles of the cities, the damage caused throughout would have been the worst ever seen. England was relatively peaceful before the Civil War, and therefore the devastation brought would have been some of the most difficult scenes witnessed in living memory. Attempting to recover the cities after such destruction, as well as the significant loss of human life, with some of those who survived having life-changing injuries, such as gunshot wounds (Rutherford 2016, 174), would have been immensely difficult.

Arguably, the legacy of the fortifications, sieges and battles is almost forgotten within the wider framework of British history. It is therefore difficult to understand how the features can be cared for if their legacy and perception are poor to begin with. However, the archaeological evidence discussed demonstrates the wealth of knowledge available and shows that there is further information on the fortifications underneath the buried environments of the three cities.

The destruction of numerous fortifications immediately after the conflict demonstrates how people wanted to forget the ravages of the war and return to their previous work and daily lives. The lack of surviving evidence is perhaps apt, considering the destruction caused to suburbs, industry and livelihoods by the creation of the fortifications and the fields of fire. The evidence of the removal of the fortifications of Gloucester so soon after the war demonstrates how the people wished to move on from all that they had witnessed. Indeed, rebuilding of the city started a mere three months after the 1643 siege, with material from St Owen's Church being used to repair the Crypt School, and some 11 plots were made available for lease in 1644, 1645 and 1647 in Marybone Park for new buildings (Atkin and Laughlin 1992, 142, 145).

The perception of the surviving Civil War fortifications is enhanced when the fortifications are examined together, rather than as individual sites. Even examining the sites from different cities illustrates the symbolism of the fortifications and the divisive nature of civil wars.

The fortifications of the conflict are but one aspect of the English Civil War, a turbulent time in British history and one that struggles to maintain and reinterpret its place in that history, surrounded by earlier and later conflicts of equal importance. The sieges and battles that involved the fortifications require further analysis and appreciation to become as entrenched in the consciousness of the people as the battlefields of Marston Moor and Edgehill have grown to be. The fortifications have a legacy: an importance in the contemporary landscape; whilst their perception as male-dominated structures continues to, in part, hold firm, further excavation and analysis of these features are required to fully appreciate the roles they played in the conflict, which has shaped the British Isles.

The evidence examined for Bristol, Gloucester and Worcester has shown that the landscape, topography and geology determined where the fortifications were to be constructed. Both Gloucester and Worcester had suburbs destroyed to create smaller defensive areas and to maximise the fields of fire of the artillery and the defensive roles of the fortifications; to a greater extent, Bristol utilised the existing topography to position its fortifications, particularly around the northern circuit. Whether it was the utilisation of the existing landscape and features

or destroying the existing features to create a new defensive barrier, the archaeological evidence and the GIS viewshed analysis demonstrate the importance of controlling the rivers, the main road networks and the high ground, where it existed, in all three cities. This evidence has demonstrated that the Civil War was about the control of territory to aid supplying armies with the equipment and materials necessary to wage war, particularly in the Upper Severn region.

When comparing the fortifications constructed during the Civil War with the older fortifications of Ancient Egypt, the Hittites, the Greeks and the Romans, as well as medieval castles, whilst the fortifications themselves had changed to combat the threat of artillery, the nature of warfare had not and indeed did not change even into the 20<sup>th</sup> century, with the ditch being one of the primary defensive features against tanks during the Second World War. As Fissel (2001, 181) notes, the “noble Roman, ambitious Plantagenet, and the modern commander still shared the same common concern: to take the stronghold with as few casualties as possible”. The ditches and ramparts described and analysed throughout this thesis in relation to Bristol, Gloucester and Worcester would have been familiar defensive features and necessities to generations dating back thousands of years. This also explains why sites such as the Iron Age hillfort at Castle Dore and the Maumbury Rings were re-used during the Civil War. Indeed, when examining the evidence of the fortifications and the nature of warfare, the results add further credence to Parker’s (1976) argument that the ‘Military Revolution’ between 1560 and 1660 was a myth. The introduction of artillery did not change the nature of warfare but did affect the fortifications and human beings, both of which needed to adapt to this new weapon type, just as adaptations were made to the introduction of chariots and cavalry onto the battlefield.

## **8.5 GIS Analysis**

The viewsheds produced are ‘local’ in scale and not ‘large’ e.g. above 1:24,000, as noted by Sydoriak Allen (2000, 107). By understanding and appreciating the pre-existing landscape, the analysis of the earlier cartographic sources available, for example, Speed’s 1610 plans of Bristol, Gloucester and Worcester, remembering not to take sources at face value, the viewsheds produced, and the analysis thereof, did not ignore the existing space as Bender (1993, 4) discusses.

This is where the cartographic regression and the analysis of that methodology was vital. Whilst the methodology for Bristol and Gloucester was largely successful, there were issues with Worcester. The methodology has illustrated that 18<sup>th</sup> and 19<sup>th</sup> century maps,

including the presumably earlier Plan D12862 of Gloucester, can be successful georeferenced into more modern and increased accuracy maps. The successful georeferencing has demonstrated the accuracy of some of the cartographic sources and the important information that can be ascertained from them, such as Turnor's (1802) plan of Bristol and Roper and Young's (1808) map of Worcester.

Another success was the georeferencing, in the case of Gloucester, of the Atkin's (1988) Southgate excavations and the results of the (1993) discoveries at Outer Northgate. The importance of archaeology and the information it can reveal was confirmed by the georeferencing, and, this in turn, validated the cartographic regression methodology by producing a new plan of the defences using that data.

It is because of this archaeological information, in conjunction with the historical sources, and the cartographic sources that the methodology employed for the cartographic regression analysis, was not based on just the cartographic sources, a warning given by Hacıgüzeller (2012, 253).

The use of geological and contour data to produce the new plans, and the analysis of viewsheds of the positions of the artillery and fortifications, has emphasised the importance of the landscape when examining the data, as noted by Gillings (2012, 608). The importance of how people in the past experienced their landscape, as discussed by Hu (2012, 86), is illustrated in the placement of the fortifications at The Butts Bastion and the bastion at The Butts / Farrier Street of Worcester. Despite the strategic and tactical issues of positioning fortifications in such proximity, the evidence suggests that, to the people, the environment and the landscape of the northern sector was vital to hold, and, therefore, some compromise, in order to successfully maintain control of that area, after a battle / siege, was necessary.

When comparing the viewshed analyses of Bristol, Gloucester and Worcester, the evidence demonstrates that whatever high ground existed, however little, attempts were made to control it. The analysis confirms the necessity to control the high ground. This is particularly evident with the control of Brandon Hill and Windmill Hill (Royal Fort) in Bristol and Fort Royal Hill in Worcester.

The research has also shown that intervisibility throughout all three circuits was not an issue. In addition, the supply and communication routes and the river networks were either visible or were in reach of the artillery of the age. The fact that all the fortifications were visible demonstrates that the division of the landscape (into fortifications and ditches), was and is, an important and ongoing spatial and temporal process. The importance of appreciating the

landscape is essential to understand how the armies moved throughout the evolving space and how this affected the group and the individual (Llobera 1996, 614).

The research has confirmed the validity of the historical record by demonstrating a gap in the defences of Bristol in 1643 for Washington's Breach and the hollow way described by de Gomme in 1645. There is a similarity for Gloucester, as the corner of the Roman / medieval wall between the East Gate and the South Gate was the most vulnerable position, with Papillon noting this problem.

By comparing the GIS viewshed analysis data and the archaeological evidence, the results have explained why the positions were chosen and the attempts made to reinforce the positions. For Bristol, this can be clearly seen in the attempts to bolster the defences at Tower Harratz and the Watergate, along with similar evidence at the South Gate in Gloucester, with the addition of cartographic evidence. Interestingly, the evidence examined in Worcester, specifically at the St Martin's Gate and The Blockhouse / Friar's Gate positions, highlights the hurried attempts to fortify the landscape. The evidence clearly demonstrates that all three cities had weaknesses in their defences.

Overall, the GIS viewshed analysis has demonstrated the importance of the landscape and the overriding influence it had on the positions of the fortifications. The evidence has demonstrated that the essential factors discussed in Section 2.2.6 Site Analysis, specifically high ground, supply routes, communication lines and rivers are crucial for sitting fortifications. Ultimately, it created issues for the commanders attempting to control the important supply and communication routes. In the cases of Gloucester and Worcester, the answer to this problem was to reduce the size of the city they needed to hold. This was done by burning the suburbs, thereby attempting to create a tactical and strategic advantage with an effective field of fire. For Bristol, the surrounding topography was one of the essential elements in its downfall, not once but twice.

## **8.6 Summary**

The information examined in this chapter has demonstrated that the archaeological evidence for all three case studies shows that the landscape was significantly altered because of the English Civil War.

The construction of gun and artillery placements in Bristol and Gloucester, as well as significant and complex fortifications with a continental influence in Worcester and Bristol shows that the fortifications had important impacts on the landscapes and cityscapes, they were constructed in.

Of interest are the differences in utilising the rivers in Gloucester, where flooding was used as an aid to defence, and in Worcester, where the opposite occurred. Constructing fortifications to the literature's standard was a complex task, with a variety of fortifications not complying, but sites from all three case studies have revealed evidence that, in part, a methodological approach was followed.

Analysis of the topography has demonstrated that the landscape dictated the placement of the fortifications. Whether it was the surrounding hills of Bristol at 79m and 76m aOD or the lower positions of Gloucester at 15m, 14m and 12m aOD and Worcester at 21m, 20m and 18m aOD, whatever high ground existed, and however little was available, attempts were made to control and command those areas. Whether this was ultimately a correct decision is noted by history.

Cartographic evidence for all three case studies shows how rapid the removal of large portions of the evidence for the fortifications was. It also demonstrates an insight into the population's mindset in actively wanting to remove physical evidence of the conflict from the landscape.

The cartographic evidence links with the legacy, significance and/or relevance that the fortifications had or have. All three cities have evidence of an important legacy, with sites such as Brandon Hill in Bristol, the Vineyard near Gloucester and Fort Royal in Worcester.



## **Chapter Nine: Conclusion**

### **9.1 Introduction**

The central premise to this thesis was that current research and understanding of the fortifications constructed during the English Civil War lack explanations of why they were sited at specific points in the landscape. This work has demonstrated that the engineers and planners understood the importance of the landscape, how it altered their plans for constructing defences and how they had to modify, in some cases destroy, parts of the city in order to defend the whole.

### **9.2 Research Questions**

The four research questions proposed at the start of this thesis are finally addressed:

#### **9.2.1 Did the Landscapes and Cityscapes of the Civil War Period Influence the Design and Placement of the Fortifications?**

By the middle of the 17<sup>th</sup> century, towns and cities throughout the British Isles had expanded beyond their medieval walls. The case study of Bristol illustrates that it was the surrounding landscape, particularly around the northern circuit, that influenced the placement of the fortifications. It was necessary to construct a series of defences utilising the *enceinte* system. Control of the hills around the city was vital to holding the city itself. This entailed the construction of an earthen bank and ditch system in a circuit of at least four miles in length. Evidence for the control of the surrounding landscape is further demonstrated by cartographic analysis. Later maps, initially Millerd's 1671 plan, show Brandon Hill and the site of the Royal Fort as prominent positions in the landscape, with Turnor's 1802 plan demonstrating why the fortifications of the Water Fort, Brandon Hill, Windmill Hill Fort (the Royal Fort), Colston's Fort and Prior's Hill Fort were constructed where they were: for command of the high ground.

The control of the city continued, now utilising the surviving medieval features around the southern circuit, illustrating that the use of the existing structures meant that the landscape did influence the placement of the fortifications. Some examples have been revealed through archaeological excavation of the Portwall. One of the most important examples is demonstrated by the discovery of a gun battery to the north-east of a medieval circular tower at Tower Harratz. This illustrates the importance of the pre-existing landscape to the placement/creation of new fortifications. The location of the tower, near the river, explains why it was felt necessary to construct a battery nearby.

Excavations of the Portwall have continued to demonstrate the influence that the existing landscape had on the construction of the fortifications, their positions and their design. A 3.2m opening in a wall combined with another of 1.97m and evidence of a musket loophole all demonstrate how the landscape influenced the placement of artillery and musketry positions. A key feature might have been the construction of a ravelin.

The archaeological evidence from Gloucester Lane illustrates the effect that the existing landscape had on the placement of the fortifications. The ditch was created in order to defend the Lawford's Gate entrance into the city and was cut to a significant depth of 2.1m, with a steep angle of 35° and 6.2 m in width at the top. The cutting of the ditch to 2.1m, along with a width of 6.2m, illustrates that the most basic defensive feature, the ditch system, used throughout history and pre-history, was utilised to stop the advancement of soldiers attempting to take command of the gate.

The evidence of Bristol in both 1643 and 1645 illustrates that the placement of the fortifications was paramount and that the cityscape and landscape influenced the positions, although the fortifications in 1645 owed their positions in part to the re-use of the structures already present.

Analysis of the geology demonstrates the influence that the landscape had on the height, width and length of the fortifications. In obtaining the high ground, the construction and design of the fortifications suffered. For example, the Water Fort, Brandon Hill Fort and Windmill Hill Fort (the Royal Fort) were all built on Quartzitic Sandstone Formation with loam clay of a light-to-heavy silty consistency. Even de Gomme (1925, 184) noted in 1643 when discussing the ditch of Brandon Hill Fort that "its Graff or mote but shallow & narrow, by reason of the rockynesse of the grownd". The fact that the fortifications of 1643 have been described by the historian John Lynch (1999, 37) as structures that "can be compared with the 'pill box' of later conflicts" illustrates, in part, the impact that the landscape had on what could be designed and constructed.

The most striking archaeological evidence is from the Royal Fort. The evidence suggests that the fortification was not ready for an assault in 1645. A bastion face of only 12m in length with a flank of only 5m in length would have been insufficient to halt a direct assault, and de Gomme's own account suggests that the fortification was not complete. It was the landscape (the geology), combined with a lack of men and resources, that hindered the fortification.

The placement of the fortifications in Gloucester was influenced by the existing landscape. The most prominent evidence comes from analysis of cartographic sources. The

compact nature of the existing early post-medieval landscape and the importance of the River Severn, as illustrated on Speed's 1610 map, help to explain why the fortifications were constructed where they were. Plan D12862 illustrates that because the surrounding landscape, particularly the north-west, was "verie lowe", the approach to Gloucester's defence and control needed to differ from that of Bristol.

The plans demonstrate the importance of controlling the River Severn and that the existing features of Alvin Gate, the Outer North Gate, the East Gate and the South Gate formed the basis for defence, as well as the reason why they were enhanced with earthen fortifications. Despite the castle not being fit for purpose, it was felt necessary to construct a breastwork there, given the site's proximity to the river, which also explains the position of the fortification at The Key. Toponymy suggests that Barbican (Barbycon) Hill required a fortification; however, analysis of the topography shows that the site was only at 10m aOD. Despite this low height, any strategic advantage over such a generally low-lying landscape would have been significant.

The topographic analysis demonstrates that the landscape influenced the placement and design of the fortifications, including the refortification of Whitefriars Barn, located at 14m aOD. The re-use of the Roman wall in the south-east of the city demonstrates the importance of using any available material to defend the city, in addition to fortifying Friars' Orchard (Barn?) located at 12m aOD.

The construction and positioning of fortifications outside the city, namely the sconces on marshy Alney Island and the fortification at the Vineyard, also demonstrate how the landscape affected the placement of the fortifications. The position of the fortifications was also influenced by the local topography, as the sconces on Alney Island were at 10m aOD and the Vineyard fortification was at 19m aOD.

The historical and archaeological evidence is a testament to the effect that the landscape had on the construction of the fortifications. Evidence of mining and countermining from the besieged Parliamentarians and besieging Royalists attests how the landscape shaped the sieges and the events thereof. An archaeologically recovered example is that of Gooseditch, with the ditch being recut to stop it flooding.

The existing landscape of Worcester influenced the design and placement of the fortifications. As in Bristol and Gloucester, control of the river, in this case the River Severn, was paramount. This explains the positioning of the fortification at the Causeway and, in part, St Clement's Sconce. The existing medieval wall formed the basis of the positions of the majority of the defences. This explains the positioning of the bastions at The Butts, The Butts / Farrier Street, Sansome Street, Severn Street, and Severn Street / Diglis. In addition, the

sconce at St Martin's, the bastion to the south and The Blockhouse at Friar's Gate were positioned primarily to control movement through the gates and to utilise those positions as part of the overall defensive strategy. As well as utilising the existing medieval structures, the positions illustrate attempts to hold the high ground, with the fortifications at The Butts, The Butts / Farrier Street, Sansome Street and St Martin's all above 20m aOD. The construction of earlier fortifications and the subsequent sconce on Fort Royal Hill provide evidence that the landscape influenced the placement of the fortifications, with the site being at 38m aOD.

Archaeological evidence demonstrates the impact of the existing features on the construction and placement of the defences, with excavations from 42 Severn Street and 3–5 The Butts revealing the recutting of medieval ditches, and evidence from 3–5 Cornmarket demonstrating the strengthening of medieval defensive features.

Cartographic evidence, such as the anonymous 1640s map of Worcester, demonstrates that the existing landscape, particularly the medieval wall and gates, would have proven a useful starting point from which to begin refortification.

Many of the fortifications, including The Butts Bastion, The Butts / Farrier Street Bastion, St Martin's Sconce and the bastion south of St Martin's Gate, are shown on *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651* (References: 899.41, x899.426 4885(iv) and 6899.25 372) and on Blount's (1662) Boscobel map as a series of flanks and bastion faces emanating from the city wall. This is clear evidence of the impact that the existing landscape had on the design of the fortifications.

It is also appropriate here to utilise the evidence from the GIS viewshed analysis when answering this question. The evidence demonstrates that the landscape determined where the fortifications were sited. The analysis demonstrated for all three cities that, by and large, key positions were either visible and/or had covering artillery.

The most striking evidence confirms that the artillery positions could not reach the breakthrough point of Washington's Breach in Bristol in 1643. In addition, the evidence indicates that whilst Windmill Hill Fort (later the Royal Fort) was a key position of the northern circuit of Bristol, Bernard de Gomme correctly noted a potential problem to the north-west of the northern bastion. The landscape also directly influenced the placement of Fort Royal in Worcester, and this research has confirmed its important role. The landscape influenced the positioning of The Butts Bastion and the bastion at The Butts / Farrier Street, despite compromising the effectiveness of those positions. The existing landscape of Gloucester, particularly the Roman/medieval wall, added further credence to the decision of the Royalists to bombard that section of the defences.

The GIS viewshed analysis demonstrated that whilst visibility and indeed the majority of the artillery coverage were not an issue, gaps and weaknesses, however small, were exposed by the tacticians and commanders of the day in an attempt to secure each city for the king or Parliament.

Overall, the historical, archaeological and cartographic information demonstrates that the landscape influenced the design and placement of the fortifications. The evidence from each case study demonstrates that the surrounding landscape influenced the placement of the fortifications, which was the priority, as their design came second. Control of the landscape, or at least the image of control, was necessary. Re-using the existing features, such as city ditches, medieval castles and other sites, illustrates how much the existing landscape influenced the Civil War fortifications.

### **9.2.2 What Impact Did the Civil War Fortifications Have on the Landscapes and Cityscapes in Which They Were Constructed?**

Whilst the fortifications of the Water Fort, Brandon Hill Fort, Colston's Fort and Prior's Hill Fort had little impact on the existing city of Bristol, the works of Essex Fort, Windmill Hill Fort, Tower Harratz, the Portwall and the Watergate did.

The construction of Windmill Hill Fort altered the existing landscape by removing the windmill, thereby damaging the local economy and affecting the landscape. Archaeological evidence shows that the construction of Essex Fort at the edge of the medieval city created significant change in the immediate area, with the construction of a ditch of at least 50m in length and 7.5–9m in width. Further archaeological evidence from the Watergate demonstrates the alterations required to create defences in the city. The creation of a gun emplacement and the blocking of the sally port, along with the excavation of large amounts of clay to support the existing structure, are important evidence highlighting the significant impact that the fortifications had on the landscape.

The immense impact that the fortifications had is clearly demonstrated in Gloucester. The cartographic analysis demonstrated that where Speed in 1610 depicted a city expanding beyond its Roman and medieval walls to the north, south and east, the historical and archaeological research reveals evidence of destruction and significant impact. In order to have successfully created a field of fire to utilise the artillery and men available, Colonel Massey felt that it was necessary to destroy suburbs and thereby one-third of the city. Archaeological evidence for this was found at 106 Southgate Street.

Further evidence illustrating the effect that the construction of the fortifications had on the city and the requirement to maintain a strategic and tactical advantage was revealed from additional excavations on Southgate Street in 1988, showing a 3cm layer of destruction dated to 10<sup>th</sup> August 1643, when the people made a conscious decision to destroy parts of their city. The destruction of St Owen's Church demonstrates that any structure, regardless of significance, would be destroyed to maintain control of the main city.

Additional evidence of the impact of constructing fortifications is further demonstrated by the archaeological record, with evidence of soil importation from near the River Twyver, whilst excavations at Ladybellegate Street Car Park showed evidence of soil removal. Despite the evidence from each site showing differences, it demonstrates that major alterations to the landscape took place in order to defend what remained.

The fortifications' impact on the landscape of Worcester was also immense. Cartographic evidence, including the 899.41 version of *An Exact Ground Plot of the City of Worcester, As It Stood Fortified 3. Sep: 1651*, along with similar versions x899.426 4885(iv) and 6899.25 372 and Blount's 1662 Boscobel plan, whilst understanding the required caution when analysing these sources, illustrates numerous fortifications constructed in and around the landscape of Worcester.

Excavations at 42 Severn Street revealed evidence of roof tiles, pottery and charcoal, indicating the destruction of a suburb, illustrating the importance of defending the main part of the city from a successful assault. The evidence of destruction is further enhanced by historical records showing that, in another area, the suburb of Foregate was destroyed to make way for the construction of a sconce.

Further evidence clearly demonstrating how much of an impact the fortifications had, also from Severn Street, was the discovery of a U-shaped ditch 7.62m in width and 2.43m in depth, along with evidence of a bank and a trench with palisades. The size of the ditch shows how the landscape was altered in such a significant way, with the evidence of palisades showing how much time and effort went into entrenching and preparing to hold a position.

Archaeological evidence from The Butts revealed significant modifications to the landscape. The ditch dimensions of 3.5m in depth and 16m in width alone indicate the impact that the fortifications had on the landscape of Worcester. This is further illustrated by evidence recovered from the position of St Martin's Sconce, illustrating the destruction of a tilehouse and houses within the Lowesmoor area to create a field of fire.

The fortifications had less impact on the city of Bristol than on Gloucester and Worcester. This was because of the landscape. The fortifications to control Bristol were



constructed in positions that utilised the hills surrounding the city to the north. The impact of the fortifications was greater in Gloucester and Worcester because of the lack of high ground. The requirement to construct fortifications around key areas, such as gates and by rivers, meant the destruction of property. Gloucester and Worcester saw whole suburbs destroyed to create fields of fire and to utilise what had been constructed to the best of its ability; no structure, regardless of its significance, was safe.

### **9.2.3 How Did the Fortifications Constructed During the English Civil War Differ from the Idealised Versions Depicted in the Literature of the Period?**

The answer to this question was found by utilising the archaeological evidence. The evidence largely demonstrates that it was not possible to construct defences to the standards depicted in the manuals of the period.

Excavation data from the Royal Fort shows that the depth of the ditch cut exceeded that stated in the literature of the period, although, for comparison, the width of the ditch at Gloucester Lane was smaller than the required size stated in the manuals. Evidence of a scarp and a counterscarp at the Royal Fort does show a degree of planning and understanding, which does relate to the literature available. This can be in part attributed to de Gomme's understanding and skill as an engineer. Any difficulty in constructing the fortifications that be explained by de Gomme's own analysis of the fortifications on the northern circuit, particularly that of Brandon Hill, where the ditch was "shallow & narrow, by reason of the rockynesse of the grownd" (De Gomme 1925, 184), illustrates the geology's effect.

For Gloucester, evidence from excavations at the East Gate reveals that the dimensions were smaller than required by the manuals. However, analysis of the results from the North Gate showed that the width of the ditch did correspond with the recommended dimensions. The evidence from the excavation at St Michael's Square revealed a ditch 20m in width and 3.9m in depth, which falls short of the dimensions given in the manuals, particularly those of Norwood (1639, 112) and Ward (1639, 60). Geophysical evidence from the Vineyard revealed a buried bank 7m in width.

The evidence from Worcester shows that the information recovered archaeologically suggests some conformity with the manuals of the period, with evidence from Severn Street showing the depth of the ditch to the standard suggested. The evidence of palisades suggests significant preparation and being aware of what the manuals said was required, as does the information regarding an outer glacis bank and a fire step.

Further evidence from The Butts shows that a ditch surpassed the required depth suggested by the manuals, although, in the same region, another ditch shows the opposite. However, this is perhaps not surprising, as Norwood (1639, 112) suggests that a fortification ditch should be 42.67m.

Evidence for St Martin's Sconce revealed a steep ditch 5m in width for a bastion face, which appears to differ from the recommended dimensions. However, later excavations revealed a significant ditch and evidence of stakes, which suggest attempts to conform to the theories of the period.

Excavations near Worcester Castle revealed evidence of a 17–18m wide and at most 7m deep ditch, which appears smaller than the dimensions suggested in the manuals, particularly that of Norwood (1639, 112).

What this evidence demonstrates is that without manpower, resources and materials, commanders and engineers were unable to construct defences to the standards described and drawn in the military manuals. Reality differed from prose and artistic depictions. The landscape and time were the prevailing factors. The evidence shows that there was not enough time to construct fortifications to the textbook standards, if indeed that was at the forefront of people's minds. This is clearest when examining the historical and archaeological evidence from the Royal Fort in Bristol. Both sets of data demonstrate that the engineer de Gomme was unable to complete the fortification to his standard, despite two years of construction. Further evidence for this is seen in Gloucester when analysing Papillon's 16<sup>th</sup> July 1646 plan to enhance the defences, which included destroying some works that had been part of the successful defence of the city during the 1643 siege. What Papillon's plan shows is the constant need to work on and expand the defences; in addition, it demonstrates that people were learning lessons from the sieges. The historical, cartographic and archaeological information for Worcester shows that whilst some elements attempted to conform to the dimensions given in the literature, as evidenced at St Martin's Sconce, the task of constructing fortifications to that standard was one that people were unable to accomplish.

#### **9.2.4 What Is the Legacy of English Civil War Fortifications in the Contemporary Landscape? How Are They Perceived and Cared For in the Modern Era?**

The legacy of the surviving monuments is a double-edged sword; on the one hand, the features, like the fortifications on Brandon Hill in Bristol, at Fort Royal in Worcester and at the Vineyard near Gloucester are protected because of their Scheduled Monument status. Whilst this undoubtedly protects the monuments from degradation, on the other hand, it also hinders

research, with all three sites potentially containing valuable information on construction techniques. This is despite the valuable data that geophysical prospection can reveal.

Recent archaeological research conducted by King (2011) on Brandon Hill, Bristol, has changed perceptions of the site. The excavation data revealed that the fortification was a folly/replica. Whilst not dating to the Civil War, it probably dates to the Georgian era, which represents a change in how fortifications are perceived in the landscape. The legacy of the fortification has continued to evolve as new discoveries have been made.

Analysis from Gloucester draws interesting parallels. A surviving element involved in the conflict, the Eastgate Tower, resonates with the medieval era; whilst the act of bombarding a site for strategic and tactical purposes would have been the primary aim for the soldiers involved in the siege, it would have taken on a new meaning of destroying a symbol of the medieval age.

By examining the sites together as part of a whole, rather than individually, the role of fortifications is seen differently. Together, the fortifications would have commanded and separated the landscape and controlled the movement of people. By analysing how the fortifications worked together, the perception of the monuments is enhanced.

The perception of surviving fortifications can be seen when analysing the Fort Royal fortification in Worcester. The contrasting landscape it currently inhabits, next to mowed lawns and play areas, is markedly dissimilar to the landscape that dominated the cityscape below during and after the Civil War.

The lack of surviving features demonstrates significant issues for the perception and legacy of the fortifications. All three cities lack considerable elements of the fortifications and the networks connecting them. The lack of a legacy is demonstrated when analysing the cartographic sources. Millerd's 1671 map of the city of Bristol illustrates the rapid destruction of fortifications, along with his 1673 plan of the Royal Fort detailing how a fortification was dismantled and converted into houses. Evidence of this in Gloucester is demonstrated by an examination of the 1:10,560 First-Edition Ordnance Survey Map, which depicts very little evidence surviving into the 19<sup>th</sup> century. Later cartographic evidence for Worcester, for example Doharty's 1742 plan and Roper and Young's 1808 plan, shows how the fortifications were removed from the landscape as the city developed through the centuries.

The evidence demonstrates that the surviving fortifications play an important role in the contemporary landscape. However, ultimately, the legacy is unfulfilled, as the surviving features have much more information to reveal, if excavation and further research were undertaken.

### 9.3 Contributions of This Research

The archaeological evidence from the Civil War period contains valid and complex data requiring interpretation. The effect of the Civil War on the landscape was immense. The destruction of so much property, industry, whole suburbs and religious institutions meant that the conflict had a lasting effect on the three cities of Bristol, Gloucester and Worcester. This demonstrates quite clearly that the Civil War comfortably sits within battlefield archaeology and conflict archaeology.

The examined evidence demonstrates that the fortifications were strategically sited and, in that regard, were effective in the landscape. However, ultimately, except for the Siege of Gloucester in 1643 and the brief Siege of Worcester in that same year, the fortifications of Bristol in 1643 and 1645, of Worcester in 1646 and those present at the 1651 Battle of Worcester failed. This reality discounts the planning and effort that both sides put into deciding locations, constructing defences, destroying specific suburbs to protect others, and repairing and refortifying existing dilapidated medieval and even Roman features.

In answer to Harrington's (2003, 49) assertion that "no clear pattern emerges", the fortifications do appear to have been successfully positioned in the landscape, and whilst successful in Gloucester, the fortifications of Bristol in 1643 and 1645 and of Worcester in 1646 and 1651 were ultimately unsuccessful. However, the reason for these failures was not due to the positioning or indeed construction of the fortifications but due to the lack of numbers to defend the cities.

Despite Gloucester not falling to the Royalist siege, the evidence of mining, countermining and grenades in Gloucester in 1643 shows how complex the Civil War conflict was. Combining the historical and archaeological evidence demonstrates how the human condition evolved and changed because of the conflict. The individual battles for control of the surrounding landscape show the ingenuity of the people's attempt to capture a city and the willingness and resourcefulness of the defenders.

The use of GIS demonstrated the importance of the cartographic sources and their value when examining the positions of artillery and fortifications. The methodology successfully demonstrated georeferencing of 18<sup>th</sup> and 19<sup>th</sup> century maps; thereby illustrating an important new model for future investigations into other town and cities.

The GIS viewshed analysis demonstrated successfully another new (theoretical) methodology for examining the positions where the fortifications were sited and the ranges of the artillery and musketry of the period, which can be applied to future case studies. For example, the viewshed analysis confirmed that the artillery positioned around the

Parliamentarian defences of Bristol in 1643 was unable to reach the area where the Royalists successfully breached the city's defences, now known as 'Washington's Breach'. In addition, the methodology confirmed de Gomme's noted concern regarding the problem of the hollow way near the Royal Fort in 1645. In Gloucester, the viewshed analysis confirmed the weaknesses of the position to the south of Friars' Orchard and explained Papillon's recommendation after the 1643 siege to construct a bastion at that location. Whilst the analysis of Worcester did not highlight major flaws in the positioning of the fortifications and artillery, apart from the questionable positioning of The Butts bastion and the bastion at The Butts / Farrier Street, the result demonstrated the importance of controlling the high ground, particularly the standing of the fortifications constructed on what was later described as 'Fort Royal Hill'.

The examined evidence demonstrates that whilst there were technological changes (in this case, changes in the fortifications following the introduction of artillery), the nature of warfare had not changed for thousands of years. Just like the fortifications built during pre-history, in Ancient Egypt, by the Hittites, by the Greeks, by the Romans or in the medieval era, during the Civil War conflict, commanders chose the high ground (where available), used the local topography to their advantage (again if available) and created defences to adapt to the weapons of the period. The introduction of artillery did not change the nature of warfare, simply the fortifications required to attempt a defence against this new weapon type.

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